

LAN-G-0066

68
File
B/CP
CRSP

**FINAL PLANNING REPORT
for the**

**BEAN/COWPEA
COLLABORATIVE RESEARCH
SUPPORT PROGRAM**

**Prepared by
The DEPARTMENT of CROP and SOIL SCIENCES
MICHIGAN STATE UNIVERSITY**

**Submitted to
The JOINT RESEARCH COMMITTEE
of the
BOARD for INTERNATIONAL FOOD and AGRICULTURAL DEVELOPMENT
and
The UNITED STATES AGENCY for INTERNATIONAL DEVELOPMENT**

June 10, 1980

F. E. Hutchinson

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

June 10, 1980

Dr. Fred Hutchinson, Chairman
Joint Research Committee of BIFAD
c/o US/AID, Department of State
Washington, D.C. 20523

Dear Dr. Hutchinson:

On behalf of the College of Agriculture and Natural Resources and its Institute of International Agriculture, I am pleased to transmit herewith the Final Planning Report on the Bean/Cowpea Collaborative Research Support Program prepared by Michigan State University under Grant # AID/DSAN-G-0066 recommended by the Joint Research Committee of the Board of International Food and Agricultural Development and administered by the U.S. Agency for International Development under Title XII legislation.

We present the Report with two important qualifications and recommendations:

A. Qualifications:

1. The country research designs, although worked out in all cases jointly between LDC and U.S. collaborators or their representatives, have not been officially approved by the appropriate administrative personnel in the LDC's or U.S. institutions. Formal Memoranda of Agreement to Collaborate will have to be negotiated at the legal level with the institutions involved. There may be, in addition, need for greater "in-depth" research designs in certain cases not at this time finalized.
2. The S.O.T.A. (State-of-the-Arts) document, which the Planning Entity, agreed to prepare, is not included in this Report. This document is under preparation and an interim report will be presented at a later time.

B. Recommendations:

The Plan itself is a recommendation. But there are certain key issues tucked away in the Plan which we think need setting forth here for the sake of clarity.

1. We recommend the Global Plan at Support Level 3 - the "Preferred" Plan--described on pages 22-27, at an annual investment of \$3.4 million.
2. We recommend the LDC's and institutions named in Figure 1, page 29 as the initial hosts for the CRSP.

3. We recommend approval of the proposals and listed U.S. institutions and/or investigators as listed on page 41 and in Appendix G, commencing on page 127, for the initial U.S. involvement, with the qualification that the collaborating group with C.I.A.T. has not been finalized.
4. We recommend a Management Structure as diagrammed on page 41, including the indicated LDC-International Centers-U.S. Institutional linkages.
5. We specifically recommend final approval of the ten (10) U.S. institutions named on page 34 for initial involvement in the CRSP.
6. We specifically recommend Michigan State University to serve as the Management Entity, as indicated by action taken at a special meeting of delegates from approved institutions on April 28, 1980 in Chicago.
7. We recommend that Michigan State University, the Management Entity designate, be authorized to activate the Board of Directors and Technical Committee, as recommended on pages 37-39, and to proceed with organizational responsibilities during the interim period commencing July 1, 1980.
8. We recommend a Program Management Budget of \$292,727 per year as outlined on page 42.
9. We recommend acceptance of the Report as fulfillment of the contract between US/AID-JRC and the Planning Entity, with the qualifications noted above.

Finally, we express our sincere appreciation to the many talented and selfless individuals both in the U.S. and from other lands, who have joined us in this planning enterprise. The road has been longer than we first anticipated, and rockier. We are grateful for the strong support from many quarters that has culminated in this Plan and Final Report.

Respectfully submitted,



M. W. Adams, Planning Officer
Title XII Bean/Cowpea Planning Program

MWA:kc

cc: Dean James Anderson
Dean Ralph Smuckler
Director Sylvan Wittwer
Assistant Dean Irving Wyeth
Dr. D. D. Harpstead

2

MICHIGAN STATE UNIVERSITY

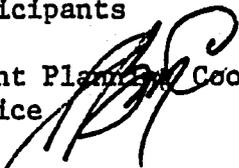
DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

June 10, 1980

MEMORANDUM

TO: JRC Members and Workshop Participants

FROM: Pat Barnes-McConnell, Assistant Planning Coordinator
Bean/Cowpea CRSP Planning Office 

SUBJECT: Women in Development Position

The Bean/Cowpea CRSP Planning Office has recommended a management structure for Bean/Cowpea CRSP implementation which includes a part-time professional Women in Development (WID) Specialist. It is appropriate that such a position be included in all CRSPs concerned in any way with subsistence agriculture.

Throughout the developing world, women's contribution to subsistence agriculture is dramatic. In the literature, the percentage of females among subsistence farmers is reported to be as high as 60%. Personal communications with various governmental and research leaders throughout Africa have corroborated this report, some suggesting the percentage is even higher.

Work perceived as women's work is generally taken for granted and holds low status the world over. Yet such work is usually critical to the well-being, if not the outright survival, of the group for whom it is performed. The reality of this statement reduces to absurdity those programs, developed to increase the food and nutritional status of persons suffering from famine and malnutrition, which pay lip service to the female farmer while conscientiously building-in new constraints, further impeding her ability to function.

Such a problem is neither minor nor simple to solve. There are no answers to many associated questions. But we do know there is a problem. We do know there are developing methodologies to address the problem. And we do have a responsibility to go beyond rhetoric in meeting the challenge.

The WID specialist has available increasing WID literature and a series of growing WID networks all over this country and throughout the developing world. Making use of these resources, the WID specialist can work integrally in overall CRSP implementation, monitoring the individual projects, making constructive suggestions as to expanded research needs, identifying appropriate U.S. and LDC resource persons, and educating the uninformed relative to the needs of women. Effective assessment of the planned and unplanned program impact on women suggests, for example:

1. Involvement of U.S. women as part of the research teams
2. Involvement of women in cooperating countries as part of the counterpart teams and in team activities

3. Addressing related women's issues in the substance of the projects
4. Identifying women's communications networks for continuing input from those most affected

The WID specialist should be thought of as a facilitator, a consultant to the Program and its projects, who is knowledgeable about the historical and social context within which the projects take place and who is especially sensitive to the reality of the women farmers there. When necessary such a person could request assistance from other resource persons more experienced or knowledgeable about a certain country.

There are many questions yet to be answered, both methodologically and informational. Well meaning, but divided, unfocused attention will not get at them. There hardly seems to be a better place to begin than with each CRSP, as they evolve a total and comprehensive program directed toward solving the malnutrition and famine problems of the people in the low income countries.

It is recommended that a part-time Women in Development Specialist become a permanent, professional position in the CRSP Management Entity administrative structures.

PBM:kc

4

Department of
Horticulture



Corvallis, Oregon 97331 (503) 754-3695

RECEIVED
JUN 3 1980
VICE PRESIDENT
RESEARCH AND PUBLIC SERVICES

Dr. Donald R. Wood
Department of Agronomy
Colorado State University
Fort Collins, Colorado 80523

May 21, 1980

Dear Don:

Thank you for sending a copy of your evaluation of the "Bean/Cowpea Global Research Plant" as presented at the Development meeting on April 28th, 1980.

As I do not have a copy of the Research Plan (since Oregon State was not included at this meeting), it is difficult for me to comment on specific items. However, since we have been participating in the Title XII activities beginning in January 1977, I feel qualified to express my thoughts on the whole Bean/Cowpea CRSP process.

The planning procedures of Bean/Cowpea CRSP have been handicapped from the on-set by two major constraints, lack of open communication between the Planning Entity and other US institutions, and the absence of objective and scientific identification of the problems. The first constraint was clearly demonstrated by the constant withholding, or circulating among closed circles only, of information pertinent to the planning. This has been a source of frustration for all US scientists. Another example was the arbitrary interpretations of mandates given to the Planning Entity. As you will recall, in a formal meeting at Chicago (August 1978) involving directors of eleven experiment stations, Michigan State was elected as the Planning Entity with the understanding that the respective directors would be consulted for major decisions. The latter part of the endorsement was never adhered to and the members given the Planning Entity its mandate were not consulted except being informed after certain steps had been taken. Thirdly, the basis of including or excluding certain US institutions has never been documented and examined. I can only presume that vested interests of various US scientists and the desire to obtain funding have suppressed strong objections from surfacing.

The process of identifying problem areas and the potential solutions has always been unclear to me. Although various meetings

Department of
Horticulture



Corvallis, Oregon 97331 (503) 754-3601

involving different scientists from the US and developing countries were held, the functions of these meetings and the effects of decisions made on the final conclusions have never been known. It is difficult to judge the scientific merit of any document when secrecy prevails in all the proceedings.

It should be noted that my personal opinion is definitely clouded by the arbitrary exclusion of US institutions, of which Oregon State University is one, which have the talents and the commitments to make significant contributions. It would be unfair to pass judgement on the planning process without all the information, but the ill feelings it has created thus far among bean researchers would require miraculous accomplishments in the future to justify the approach it has taken.

If past experience can serve as a guide, then it would be presumptuous to expect any of our input will have much effect on the Bean/Cowpea CRSP. Nevertheless, it should be known that the present course of action is much less than unanimous.

Sincerely

A handwritten signature in cursive script, appearing to read "David W. S. Mok".

David W. S. Mok
Associate Professor
of Genetics

cc: Dr. Clifton Wharton Jr.
Chairman, BIFAD

Dr. Frederick Hutchinson ✓
Chairman, JRC/BIFAD

Dean D. D. Johnson
Colorado State University

Director J. R. Davis

Dr. C. J. Weiser

Dr. M. W. Adams

Foreword

This Bean/Cowpea Collaborative Research Support Program Plan is the result of twenty months of planning efforts carried out at Michigan State University by a central planning team consisting of Wayne Adams, Pat Barnes-McConnell, and Donald Wallace, the latter on leave from Cornell University, with the frequent, sometimes daily, involvement of John Yohe of US/AID, and numerous U.S. and Developing Country personnel as consultants or advisors on special occasions. Often characterized by what may best be termed "Creative Tension," this multi-disciplinary team evolved a modus vivendi essential to the task of bringing together in a common cause production and utilization-oriented scientists, representing biological and socio-economic disciplines.

Critical support and advice have been given by Michigan State University administrators James Anderson, Ralph Smuckler, Sylvan Wittwer, Irving Wyeth and Dale Harpstead. Important assistance from the perspective of the social sciences was given by George Axinn, Dora Lodwick, Carl Eicher, Linda Nelson and David Wiley. Many others of the MSU administration and faculty also contributed to this effort.

Generous and almost unfailingly non-partisan support and cooperation were received from representatives of developing country institutions, international centers, and most U.S. institutions, all of whom have displayed great patience throughout the long planning process. Many cross-national meetings, both in the U.S. and in host countries, as well as frequent mail communications among collaborators, have resulted in an excellent level of rapport within most of the constituted collaborative

research teams. As the process advanced, it was the Planning Team's privilege to observe the emergence of mutual personal acceptance, professional respect and genuine regard for cultural uniqueness, among the U.S. and host country collaborators. This level of rapport was especially apparent in demonstrations of mutual tolerance of inter-cultural awkwardness and struggles with slowly developing language skills.

The material presented here is divided into five parts. Part I, Articles of a Global Plan for a Collaborative Research Support Program in Beans and Cowpeas, includes a full statement of the philosophy and principles of the Plan.

Part II is a history and report of the Bean/Cowpea Collaborative Research Support Program planning process. It includes a chronology of events and a report on the development of both the global constraint areas and the draft research designs.

Part III is the Global Plan, including the required three levels of funding and a chart showing the extent to which the constraint areas are addressed by the Global Plan.

Part IV is the Management Entity organization and procedures and includes an organizational chart of the total program.

Part V is the set of documenting appendices as referred to elsewhere throughout the text.

Finally, the success of this planning effort is due in no small measure to the efforts of Mrs. Kay Carter, the "behind the scenes" secretary who kept the information, communications, and vouchers flowing. She volunteered to work into the evenings and on many week-ends as one crisis after another surfaced. She was an important agent in bringing this planning effort to fruition.

9

TABLE OF CONTENTS

	<u>Page</u>
Foreword	i
Part I - Articles of a Global Plan	1
A. Introduction	2
B. Guiding principles of the CRSP	3
1. Characteristics of subsistence farms and implications to the CRSP	3
2. Strategy for the CRSP addressing country-specific and global objectives	8
Part II - History and report of the Bean/Cowpea CRSP planning process	11
A. History	12
B. Chronology of the planning process	14
C. Development of the statements of global constraints	17
D. Development of the draft collaborative research designs	18
Part III - The Global Plan	21
A. Three levels of support	22
B. Distribution of research	28
C. Country programs and major constraints	30
Part IV - The Management Entity: organization and procedures	33
A. Approved U.S. Bean/Cowpea CRSP institutions	34
B. Management Entity responsibilities	35
C. Program management staff	36
D. Management Entity designation	36
E. Board of Directors	37
F. Technical Committee	38
G. External Evaluation Panel	39
H. Organizational chart	41
I. Management Entity first year budget	42

TABLE OF CONTENTS cont'd	<u>Page</u>
Part V - Appendices	43
A. Documentation	45
B. Major Planning Office decisions: tasks, groups and criteria; planning group participants	55
C. Examples of Peer Panel evaluation documents for U.S. proposal review	61
D. Developing Country Advisory Group meeting: work documents (1 through 6)	73
E. Examples of returned Research Response sheets and correspondence from Host Countries	97
F. Summary of constraint priorities and priority rankings within constraint areas	107
G. Draft joint research design outlines	127
H. Examples of Planning Office communications in preparation for LDC research design development trips	217

P A R T I

ARTICLES

of a

GLOBAL PLAN

for a

COLLABORATIVE RESEARCH SUPPORT PROGRAM

in

BEANS AND COWPEAS

ARTICLES
of a
GLOBAL PLAN
for a
COLLABORATIVE RESEARCH SUPPORT PROGRAM
in
BEANS and COWPEAS

A. Introduction

The Bean/Cowpea Collaborative Research Support Program (B/C CRSP) is a modest component of the U.S. effort to address famine prevention and freedom from hunger in the developing countries of the world. Beans and cowpeas, as a major source of protein, are a staple in the diets of most of the people of Eastern and Western Africa, Latin America, and the Caribbean. An intensive planning effort has culminated with this plan, the fundamental structure of which consists of research partnerships between researchers from Host Countries, International Centers and U.S. institutions, focused upon problems of production and utilization of dry beans (Phaseolus vulgaris) and cowpeas (Vigna unguiculata).

~~Special emphasis is placed on the needs and resources of the subsistence~~
~~farm family,~~ a major producer and consumer of beans and cowpeas and a social group highly susceptible to problems of poverty, hunger and malnutrition. In most countries the large, production oriented, cash crop farms are generally located on the best lands with the most available water and the more favorable climatic patterns. Production on such farms is generally heavily oriented toward export. Thus, the production of food staples, in particular the grain legumes, is not meeting the food needs of expanding populations. ~~To the small subsistence farmer,~~

therefore, falls the major task of producing these crops, a task made particularly difficult by a variable complex of biological, physical, and socio-economic constraints.)

To identify the most important constraints facing subsistence farmers, the planning program has received substantive input from developing country representatives at several stages of plan development. Sources include Ministries of Agriculture, Faculties of Agriculture, organizational representatives, representatives of International research centers, and farmers, both male and female.

Wherever possible the planning team has attempted to exploit the complementarity of the biological-agronomic and the socio-cultural-economic aspects of bean/cowpea production and consumption.

The fundamental strategy of the Bean/Cowpea CRSP is to focus research upon problems of the small subsistence farmers, in their traditional settings, in selected countries of East and West Africa, the Caribbean, and Latin America.

B. Guiding Principles of the CRSP

1. Characteristics of Subsistence Farms and Implications to the CRSP

There are several characteristics which generally describe the small farming systems of these regions. Although there are few firm figures available, all informed estimates place the proportion of beans/cowpeas grown in mixed plantings with maize, sorghum, millets or other crops on small farms as a very large percentage (75 to 85%) of the whole of food legume production in the selected countries. Availability of water for irrigation (and the problems of irrigation management) is often a limiting factor in nearly all of these countries. For example, frequently

the land is too steep, or available water is diverted to higher value crops, or it is too costly to bring the water to the small farm sites. In addition, the small subsistence farmers cannot afford or do not want to incur indebtedness for pesticides and fertilizers. Nor do they wish to make substantial investments in machinery which for their needs and resources may turn out to be of questionable assistance.

Short seasons, periodic droughts, and variable daylengths and temperatures characterize the growing conditions. Soils are often acid, frequently infertile, and often depleted of organic matter.

Because of the absence of a cold winter season and the practice of growing the legume-cereal crop mixture recurrently on the same field sites season after season (or rotated among adjacent small fields), problems of diseases and insect pests are particularly acute and critical to obtaining economic yields. Practically all of the cultural operations are performed by hand, with simple tools, except for the occasional use of oxen for plowing on the more level sites.

~~All over the developing world, much of the farm work is done by women.~~

In parts of Africa, women select the seed stocks; they break up the soil, plant, weed, harvest, store, and market any surplus over family needs. They gather the fuel and carry the water needed for the long hours of cooking required for beans/cowpeas. Traditional bean/cowpea processing methods are limited and demand high investments of not only water and fuel, but time and labor as well.

~~Beans and cowpeas provide both protein and carbohydrates to diets of the farm family as well as the urban poor, and are the only reasonable alternative to animal protein which is too expensive for many to buy.~~

14

It is particularly important that diets of such foods for the small and growing child be palatable and digestible, produce no undesirable side effects, and provide both sufficient calories and a balance of essential amino acids.

Family goals, family structure, and the rural cultural characteristics of the subsistence farmer are little understood by western crop production scientists, yet consideration of such characteristics is crucial to the issues of appropriateness and ultimate acceptance of more productive farming practices.

The characteristics discussed above are not mere speculation. They have been supported by research and observation, documented in publications, workshops and seminars, and verified in personal interaction with scientists and farmers from the countries participating in this program. Viewed in the context of this attempt to identify the changes which can profitably be introduced into the traditional farming systems, the supportive collaborative research efforts needed from U.S. scientists working with host country professionals are clear:

a. ~~We must address~~, collaboratively with LDC scientists, the ~~problems of insect and disease control.~~ We may, in the short term, have to rely upon judicious use of non-persistent pesticides and upon novel means of applying them (for example, pyrethrums and ultra-low volume spraying); but for the longer term, we can look to the breeding of pest resistant cultivars, to protective farming practices, and to biological rather than expensive and toxic chemical control systems.

b. ~~We must support the evolution of more productive and more stable production systems.~~ The evolving systems must maintain their adaptation to the variety of conditions on small farms, perhaps utilizing

breeding for higher yields and through improved mixed cropping management.

c. ~~We must address the problem of inefficient nitrogen fixation and phosphorous utilization.~~ In order to escape the tyranny of the spiralling costs of these plant nutrients, we can investigate the development of more efficient cultivars and the evolution of more appropriate farming techniques.

d. ~~We must work to overcome problems of drought,~~ perhaps through breeding more drought resistant cultivars and the development of farming systems that are efficient and conserving in their use of water.

e. ~~We must work toward better nutritive value and digestibility of the food constituents of~~ beans and cowpeas, perhaps through breeding and by methods of food technology.

f. We must promote the creation or operation of seed multiplication programs in order to reach the small farmer with seeds of improved cultivars that are not only genetically superior but that are of sound physical quality and free of seed-borne diseases. The issues of seed availability and credit to women for seed purchases must also be addressed.

g. We must work to overcome or minimize the problem of hard seeds and long cooking time in beans and cowpeas, through both breeding and the use of simple storage or processing tactics, in order to reduce cooking time and fuel requirements.

h. We must help evolve methods of storage and of food preparation that conserve the full value of the dry grains without insect depredation, and that permit retention of full nutritive capability of these grains (or other plant parts, as applicable) when made ready for consumption.

There must be no marked alteration in the grains that detracts from their acceptance as food.

i. We must be cognizant of the interacting and sometimes contradictory results of various agronomic interventions. We must therefore carry out production/consumption-oriented research with socio-economic analysis to assess the acceptability and agro-economic feasibility of proposed interventions. Marketing studies should determine whether improvements, in terms of greater real gain to the farmer, can be made in the system.

j. We must give substantive consideration to major components of the farming system and especially the human components. We must become sensitive to and knowledgeable about the unique and multiple roles played by women in developing countries as they affect production and consumption of beans and/or cowpeas.

k. We must attempt to maintain an acceptable ecology by encouraging all collaborators to look specifically at the relationship of their research to the agronomic, social and cultural context of the small farm family. Researchers will have to assess the potential of their research for increasing or lessening the frequently overwhelming burden of daily living for such families, an assessment which will suggest the level of acceptance that can be anticipated.

l. We must address a serious problem of research personnel availability by supporting the training of indigenous professional and technical personnel. Trainees at all levels, including post-graduate students, will need to be supported in order to help build a supply of skilled individuals, both men and women, who can conduct useful and needed research and demonstration work with the food legumes.

11

m. We must facilitate the development of collaborative relationships, not only between U.S. and host country scientists, but cross-nationally among LDC scientists themselves, and among U.S. scientists as well.

~~It is a major concern of this plan that the procedures of the CRSP facilitate participation by senior U.S. professionals in true partnership with their host country colleagues.~~ It is regarded as especially important that the participants from the U.S. spend some time in the developing country on behalf of which they will be working. Thus, through visitations to institutions, research stations, farms, homes and markets, they should be encouraged to become familiar with the total environment and the specific problems being addressed. Appropriate language training must also be encouraged. The anticipated result is the emergence of a cadre of collegial individuals, comfortable and confident with one another, ready to address over the long term the troublesome constraints identified.

2. Strategy for the CRSP addressing Country-specific and Global Objectives.

We have attempted to identify, through all possible means (Appendix A), important country-specific problems which are at the same time shared to a considerable degree by several countries in a region or, indeed, throughout the bean/cowpea world. The information documented (Appendix A) reports some of the means by which country production and utilization constraints were assessed and country programs were identified.

We have attempted to follow the principle that the CRSP should not duplicate existing programs, but should add new dimensions or extensions to existing programs.

18

The CRSP, according to the strategy envisioned in this plan, would participate with country programs and regional and international centers in research activities designed ultimately to improve production, nutritive value, and utilization of beans or cowpeas by subsistence farmers.

Additionally, as a consequence of the CRSP, there is expected to be produced an increasing body of knowledge and skills essential to continuing applied research for addressing future constraints. Thus, ideally we would not join national programs merely to lend assistance to what those programs are already doing, but would attempt to develop with them a dimension that addresses issues of global concern. Practically, this has not been possible in every host country, but it does appear that the CRSP will stimulate activities and capitalize upon the competencies of individual scientists that would not soon have been undertaken or been made possible otherwise.

In arriving at the present plan we have maintained concern for:

- The need for comprehensiveness, including socio-economic as well as agricultural components;
- The need to integrate issues concerning the role of women in agricultural development;
- The need for collaboration with international centers;
- The need to foster expertise in U.S. institutions;
- The need to support some work of a basic exploratory nature, where success would have far-reaching consequences; and
- The need for continued training of developing country personnel, particularly at the postgraduate level.

19

P A R T I I

HISTORY and REPORT

of th

BEAN/COWPEA CRSP PLANNING PROCESS

20

HISTORY and REPORT
of the
BEAN/COWPEA CRSP PLANNING PROCESS

A. History

The Bean/Cowpea Planning Office undertook a thorough identification of LDC problem areas, interests and capabilities and U.S. institutional interests and capabilities. Subsequently, potentials for meaningful research collaboration between the two were explored. The problems of prioritizing the major constraints and of deciding upon the specific research problems to be undertaken collaboratively in each country were solved objectively and openly, often in ways unique to this CRSP (See Appendix B for major decision criteria and persons participating in decision recommending groups). Some of the more critical points in the process included:

1. Receipt of responses from US/AID cables to Country Missions requesting expressions of country interest which report the level of that interest as primary, secondary or tertiary.
2. Attendance of planning team at international grain legume workshops and professional meetings in Africa and Latin America where a good deal of interaction with potential collaborators contributed substantially to program planning.
3. Planning team visits to International Centers and regional and national programs to develop a more thorough sense of the state of the art and some of the current research needs. Visits included trips to small farmers' fields, rural villages, homes and markets.
4. Receipt of research proposals from U.S. researchers used as expressions of interest and preliminary indications of institutional areas of competence and available professional resources.
5. Attendance of planning team at various U.S. professional meetings where additional expressions of interest were received.
6. Peer review and evaluation of U.S. proposals by an international panel of experienced legume and social scientists (See Appendix C).
7. Convening of a group of non-U.S. legume and social scientists to prioritize constraints, suggest needed research and subsequently match this information with U.S. proposal topics (See Appendix D). Although the advice received could not be followed to the letter because of the need to avoid duplication where possible, the need to be comprehensive in the overall plan and the unique geographical distribution of necessary resources, the information was nonetheless most helpful.

8. Corresponding with identified potential LDC collaborators re research envisioned based on the information received up to that point in the process (see examples in Appendix E). Respondents were asked to rank these research items and give additional comments on the backs of the forms.
9. Bringing together one planning officer and two U.S. potential collaborators (chosen on the basis of the information received above) with national program scientists in 12 countries in Latin America and Africa to work out, on site, draft research design outlines (see Appendix G).

A chronology of specific planning office events that include the above activities follows.

JK

B. Chronology of the Bean/Cowpea CRSP Planning Process

- July, 1978 BIFAD authorized planning for Bean/Cowpea CRSP.
- August, 1978 Eleven Experiment Station representatives met in Chicago authorizing Michigan State University to submit the planning grant proposal.
- October, 1978 Planning grant awarded to MSU, effective as of this date.
- October, 1978 -
June, 1979 Dr. Donald Wallace on leave from Cornell worked with Dr. Wayne Adams of Michigan State in the planning effort.
- October, 1978 Letter to Title XII institutions requesting indications of manifest interest -- 43 responded.
- October, 1978 Wallace and Adams made orientation trips to University of Missouri and USAID-Washington. LDC questionnaires subsequently developed and disseminated.
- December, 1978 Wallace attended Western Regional Project #150 Participants Meeting in Berkeley, California to present a report on the objectives and expected planning procedures of the Bean/Cowpea CRSP.
- January -
February, 1979 Wallace and Adams visited CIAT, Guatemala, Panama, Costa Rica, Colombia, and Chile. Collected information on constraints. Met potential collaborators.
- February, 1979 Adams visited Dominican Republic, FAO meeting. Wallace visited IITA. Collected information on constraints. Met potential collaborators.
- February, 1979 Wallace attended Southern Region Meeting of American Society of Horticultural Science in New Orleans to acquaint cowpea workers of the south and southeastern U.S. with the goals and procedures of the Bean/Cowpea CRSP.
- March, 1979 Adams attended PCCMCA meeting, Honduras. Collected information on constraints. Met potential collaborators.
- April-May, 1979 Fact-finding team visits to South America, Caribbean and Mexico, West Africa, and East Africa--team members from various Title XII institutions. Collected information on constraints. Met potential collaborators.

- May, 1979 Bean/Cowpea proposals received from interested institutions responding to RFP. Proposals received from 77 persons representing 25 institutions.
- May, 1979 Dr. Pat Barnes-McConnell joined Planning Office.
- June, 1979 Wallace, Adams, Barnes-McConnell presented Interim Report to JRC, Iowa.
- June, 1979 Barnes-McConnell attended Grain Legume Workshop, University of the West Indies, Trinidad. Collected information on constraints. Met potential collaborators.
- June, 1979 International Peer Review Panel Meeting to evaluate proposals received. Sixteen panel experts represented CIAT, IITA, IICA and U.S. senior legume scientists.
- July, 1979 Progress report to JRC, Virginia.
- August, 1979 Adams and Barnes-McConnell attended Grain Legume Workshop at University of Nairobi. Collected information on constraints. Met potential collaborators.
- September, 1979 Barnes-McConnell visited Tanzania, University of Dar es Salaam, College of Agriculture. Collected information on constraints. Met potential collaborators.
- October, 1979 Developing Country Advisory Group Meeting, MSU. Reviewed and prioritized constraints relative to country needs. Subsequently matched country needs with U.S. evaluated proposal topics.
- November, 1979 Meeting with JRC for approvals of recommended Title XII institutions and meetings with collaborating research scientists abroad.
- December, 1979 Meeting of the representatives of U.S. institutions approved for involvement in further planning. Information disseminated. Constraints by geographic areas reviewed. Potential U.S. research teams designed. Proposal writers from institutions not approved for further involvement so notified. Planning extension proposal submitted to Washington. Country constraint research response sheets sent to potential developing country collaborators (scientists and institutional representatives).
- January, 1980 JRC meeting--approval of Bean/Cowpea grant extension and funds for overseas trips by U.S. representatives of potential research teams.

24

March, 1980 Attendance at East African Bean Conference, Malawi, Adams and Barnes-McConnell. Confirmation of constraints chosen for research in Africa. General research discussions with country representatives.

Attendance at PCCMCA meeting, Guatemala, Adams. Confirmation of constraints chosen for research in Africa. General research discussions with country representatives.

March -
April, 1980 Meetings on-site of potential collaborators from developing countries and the U.S. -

- a) familiarizing U.S. collaborators with the specific resources, problems, and culture of the country in which work is to be conducted; and
- b) providing an opportunity for individual scientists of the U.S. and the LDCs to get to know each others' interests, capabilities, and approaches to problem solving, as a sound preparation for:
- c) developing specific research designs and budgets to address the problems identified.

April, 1980 JRC meeting -- approval of institutions to be involved in the Bean/Cowpea CRSP.

April, 1980 Bean/Cowpea CRSP Development Meeting, Chicago O'Hare, with the 10 institutions approved for Bean/Cowpea CRSP involvement. Brief report of the collaborators' meetings, review of the draft Global Plan, decisions on the Bean/Cowpea CRSP Management Entity and the initial 5 institutions to be members of the Bean/Cowpea Board of Directors.

May, 1980 Review and comment on draft Global Plan received from participating U.S. institutions. Global Plan finalized for presentation to Washington.

June, 1980 Presentation of Bean/Cowpea Global Plan to JRC.

25

C. Development of the Statements of Global Constraints

Of the general constraint areas based on the information received, nine (9) major and comprehensive constraint areas have been identified. Broadly defined, they are:

1. Limitations due to Pests and Diseases
2. Plant Response Limitations
3. Limitations of the Physical Environment
4. Farming Practices Limitations
5. Storage and Commodity Maintenance Problems
6. Production-Consumption Economics
7. Nutrition, Food Preparation and Health
8. Socio-Cultural Factors
9. Education, Training, and Research Capability

The first six areas are listed in the order of rank as recommended by the Developing Country Advisory Group (See Appendix F). Because of the heavy agricultural bias of this group it is appropriate to view these constraints in two sections. That is, the first four constraints represent prioritized agricultural production problems and the remaining represent other related areas in bean/cowpea availability, utilization or consumption. Both sections are important in CRSP development and the various components of these sections will be addressed.

Specific problems will be addressed within constraint areas. In recognition of the impracticality of mounting and supporting large, comprehensive research thrusts in each of these constraint areas, we have narrowed the areas of proposed activities to the following problems:

1. Lack of generalized disease and pest resistance and/or effective biological control methods in field and in storage
2. Low yields and low yield stability
3. Plant sensitivity to environmental stress and lack of wide adaptation

4. Inefficiency of nitrogen fixation in the field
5. Hard seededness necessitating prolonged cooking time
6. Lack of understanding of traditional farming systems, including pertinent socio-cultural issues and the role of women
7. Difficulties in the digestibility of legume protein, for adults and especially for small children
8. Lack of improved practical processing and preserving methods to insure high quality foods from beans/cowpeas
9. Lack of information on the comparative economic values of introduced technology versus traditional practices (financial, health, labor costs, including sex roles, etc.)
10. Limited indigenous professional competencies to address critical constraints

Clearly, these are not independent problems. They are both inter-dependent and universal. Based on LDC priorities and other information received, they are problems which are geographically widely dispersed. They were distilled from the broader constraint areas to give guidance to those U.S. and Host Country collaborating scientists who were asked to prepare draft research designs for the CRSP as reported in the following section (See Appendix G).

D. Development of the Draft Collaborative Research Designs which make up the Global Plan.

The Planning Officers considered it of fundamental significance that the U.S. planners not impose their wishes unilaterally upon national programs. However, the reverse was also true in that planning office responsibility demanded concern for comprehensive coverage of constraint areas which minimize expensive duplication of effort. In the spirit of true collaboration, it was determined that the actual functioning research plans would have to be prepared jointly by U.S. researchers and host country program personnel. To that end, the Planning Office, utilizing all the previous information, selected and arranged travel of U.S. scientists

21

to attend grain legume workshops in East Africa and in Central America where most of the U.S. scientists could meet with potential host country collaborators. U.S. scientists were chosen on the basis of approved institutional affiliation, appropriateness of research interest, and overall JRC/AID guidelines. Following the workshops, pairs of U.S. scientists, together with a Planning Officer or designate, returned to the host country to work out jointly with host country personnel the actual research designs (Appendix G).

Information made available to the U.S. participants in advance of travel included returned Country Research Response Sheets, photocopies of demographic, economic, agricultural, political and socio-cultural reference material on the appropriate countries, Planning Office research design development forms with instructions, and appropriate travel information including the names and addresses of the persons with whom they would meet. Information made available to host country collaborators in advance included names and professional addresses of U.S. collaborators, their travel plans and anticipated addresses in the host country. Also included was information about the philosophy and goals of the bean/cowpea CRSP and realistic expectations for the overall pace of program development and implementation (See Appendix H for examples of Planning Office Communications).

As a result of this activity, the draft research designs were developed which became the Global Plan for a collaborative Research Support Program on Beans and Cowpeas.

~~It should be pointed out, however, that the reality of matching individual country needs and expectations with U.S. scientists' professional goals, within the framework of a global CRSP, has dictated some compromise of the ideal Global CRSP~~

plans as presented here focus on universal problems that can be addressed through a local and specific host country linkage, with enough specificity to serve a host country need, and sufficient generality to permit extension of research findings to the region or to the world.

The presentation of the basic minimal research plan (Support Level 1) is an abbreviated form of the individual research design outlines which make up the Global Plan. The full outlines for each research design as worked out collaboratively by U.S., Host Country and Planning Team representatives are given in Appendix G. At this stage they are not binding commitments on either party, but an indication of intent. These plans and budgets will be the bases of formalized agreements to be negotiated upon CRSP implementation.

29

PART III

THE GLOBAL PLAN

THE GLOBAL PLAN

A. Three Levels of Support

US/AID and JRC requested three plans be prepared; plans at a minimal, an intermediate, and a high level of funding. Furthermore, it was emphasized that the plans should be qualitatively different.

Our response to these requirements consists of recommendations for a minimal plan which we term "Support Level 1 - The Subsistence Program Plan". The intermediate funding level is the minimal plan plus strengthened country programs in specific dimensions which we identify as "Support Level 2 - The Austerity Plan". For the high-level of funding we designate "Support Level 3 - The Preferred Plan" which is the level 2 plan supplemented by six supporting areas as important adjuncts to the major constraints previously incorporated in the minimal plan. In the level 3 plan we recommend an intensification and strengthening of basic work in the areas of environmental stress, nitrogen fixation, nutrient use efficiency (including salt tolerance), and socio-cultural (including sex linked and economic) constraints to relevant technological development. More in-depth work is also needed in farming systems team development for assessment of bean/cowpea production in countries not included in this initial CRSP, and technical and economic feasibility of production and distribution of the seed of improved varieties to the small farmer. We recommend support for one each of a limited number of U.S. institutions to build a high level of expertise in each of the designated areas. These efforts would be developed jointly with appropriate host-country institutions to serve the entire CRSP.

The plans approach the desired global dimension in two respects. First, the plans address production and utilization problems that are nearly universal to beans and/or cowpeas, calling for a broad range of professional talents from the agronomic to the socio-economic. Second, the host countries recommended for initial work are geographically, ecologically, and culturally diverse, spanning five major regions, namely East Africa, West Africa, Caribbean, Central America, and South America.

Support Level 1 (cont.)

<u>Host Country</u>	<u>Host Country Institution</u>	<u>Lead U.S. Institution</u>	<u>Major Constraint Areas*</u>	<u>Problems Addressed</u>	<u>Recommended AID Appropriation</u>
Dominican Republic	Ministry of Agriculture	Univ. of Puerto Rico; Univ. of Nebraska	Limitations due to Pests and Diseases; Plant Response Limitations of the Physical Environment; Farming Practices Limitations	Producing and testing multiple disease resistant materials for the Caribbean zone	
Honduras	Pan-American School of Agriculture at Zamorano	Univ. of Puerto Rico; M.I.T.A.	Limitations due to Pests and Diseases; Limitations of the Physical Environment; Farming Practices Limitations	Multiple disease resistance testing of beans on small farms	
Guatemala	Ministry of Agriculture ICTA	Cornell Univ.	Plant Response Limitations; Socio-cultural Factors	Nature of wide adaptation in beans and socio-cultural analyses (Replication varying natural environmental factors--see Ecuador)	
Ecuador	Ministry of Agriculture INIAP	Cornell Univ.	Plant Response Limitations; Socio-cultural Factors	Nature of wide adaptation and socio-cultural analyses (Replication varying natural environmental factors--see Guatemala)	
Brazil	Ministry of Agriculture EMBRAPA	Univ. of Wisconsin and Boyce Thompson Pl. Res. Inst.	Limitations due to Pests & Diseases, Plant Response Limitations; Limitations of the Physical Environment	Multiple-disease resistance screening, cowpea insect pathogens, & N-use efficiency	
Guyana	Ministry of Agriculture	Colorado State Univ. & Miss. State Univ.	Farming Practices Limitations due to Pests & Diseases	Cowpea farming systems research & variety evaluation	

Support Level 1 (cont.)

<u>Host Country</u>	<u>Host Country Institution</u>	<u>Lead U.S. Institution</u>	<u>Major Constraint Areas*</u>	<u>Problems Addressed</u>	<u>Recommended AID Appropriation</u>
Regional Center	INCAP	Univ. of Washington; Kansas State Univ.	Nutrition, Food Preparation & Health; Storage Problems	Cooking time and nutritive value	
Intern'l Center	CIAT	Mich. State Univ; Cornell Univ.	Plant Response Limitations; Limitations of the Physical Environment	Bean plant responses to stress, daylength and temperature & N-fixation	
Management Entity		Michigan State University			
				Project Total	1,847,000
					292,727
				TOTAL	2,137,727

1
5
1

44

2. Support Level 2 - The "Austerity" Program Plan

Consists of the Level 1 plan --

2,137,727

Supplemented as follows:

665,000

1. A Bean Seed Quality & Multiplication Program in Honduras or Dominican Republic

2. Strengthening the eleven country programs, by adding \$45,000 per program

- Malawi: Add sampling technicians in both agronomic & socio-cultural aspects to reduce overall time to project completion.
- Tanzania: Include more small farmers in the economic comparisons & extend research sites to an additional agro-ecologic zone.
- Kenya: Provide funds for adding cowpea research to the bean project. Kenya, with a large Sahel region, grows and consumes both crops and includes them both in their academic program in legume agriculture.
- Nigeria: Enlarge sample size in both control and experimental groups & add sampling technicians. Increase education and training opportunities for participants.
- Cameroon: Extend the drought resistance work of Senegal and Kenya into Cameroon, and promote integration of East and West African programs of training.
- Senegal: Extend drought resistance testing program into Cameroon and provide collaboration with the Kenya program. Enlarge research program to include additional ecological zones.
- Dominican Republic: Increase number of times tested and number of testing sites.
- Guatemala: Reduce time needed to project completion.
- Ecuador: Reduce time needed to project completion.
- Guyana: Provide sufficient funds to include a full breeding component.
- Brazil: Addition of a cowpea insect resistance breeding component involving the University of Florida.

3. CIAT: No change

4. INCAP: Enlarge germ plasm base used in testing to include the East African gene pool.

5. Management Entity: Hold multinational conferences on beans and on cowpeas to encourage greater communication and cooperation among the host countries as well as among the U.S. researchers.

TOTAL 2,802,727

3. Support Level 3 - The "Preferred" Program Plan

~~Consists of the Level 2 Plan~~

2,802,727

~~Supplemented by six special supporting programs~~

600,000

These programs are as follows:

- a. Environmental Stress Laboratory for Beans and Cowpeas to be established jointly between a U.S. institution and a host country possessing appropriate natural stress conditions.
- b. Nitrogen-fixation Effectiveness Laboratory; to be established between a U.S. institution and one or both international centers.
- c. Nutrient-Use Efficiency and Salt Tolerance Laboratory to be established jointly between a U.S. institution and an appropriate host country.
- d. Farming Systems Research Team combining both production and socio-economic disciplines, formed to analyze bean/cowpea production systems in each CRSP linkage, and to initiate exploratory analyses in other interested countries not presently in the CRSP.
- e. International team of food science, socio-cultural and socio-economic scientists, comprising both U.S. and LDC personnel, to evaluate constraints to relevant technological development in zones representative of different cultures and economic levels.
- f. Development of high quality seed production systems and techniques for introduction of high quality seed of improved varieties to small farmers.

These suggested programs address issues and problem areas that could not be addressed in sufficient depth in plans described for Support Levels 1 and 2. Furthermore, these programs are consistent with the first two plans, in being directed toward biological and social solutions to problems, and solutions requiring intermediate to low technology. As in the previous plans, these suggested extensions are directed toward small farmers, but the value of breakthroughs in nitrogen-fixation efficiency, environmental stress resistance and nutrient-use efficiency is not limited to the small farmer only.

With respect to implementation, we recommend a minimum of \$100,000 per program, plus U.S. institutional matching of 25%. At such time as funds become available, it would be the responsibility of the Board of Directors to select the appropriate lead U.S. institution for each program funded.

TOTAL COST

\$3,402,727

B. Distribution of research

A diagram of the Global Research Plan is presented in Figure 1. In Africa it is anticipated that most of the research on cowpeas, a sub-humid to semi-arid crop, will be done in the drier regions of West Africa, Senegal and Cameroon. Because of the excellent laboratory and human resources available in Nigeria, cowpea health and nutrition work have been assigned to that country. Bean research on the other hand, is envisioned mostly for East Africa, in Kenya, Tanzania and Malawi. These countries have communicated with the Planning Office frequently throughout the planning process and are ready to negotiate the final agreements. Because of the various IITA stations and programs within these countries, it is anticipated that the most appropriate IITA collaborations will be achieved predominantly at these outreach stations.

In Central America, South America and the Caribbean, cowpea research is for the most part confined to Brazil and Guyana. The IITA program in Brazil will be the focus of work in that country. Bean research, including replication across ecological zones will be conducted in Ecuador, Guatemala, Honduras, and the Dominican Republic. Among these latter four countries, two of the bean programs will be minimal, large enough only to insure adequate regional trial replication.

The regional nutrition center, INCAP, is ready to collaborate with several of the participating U.S. institutions on problems such as factors affecting cooking time and protein digestibility of beans. The international center in Colombia, CIAT, has held numerous discussions with the Planning Team and expects to participate as indicated.

37

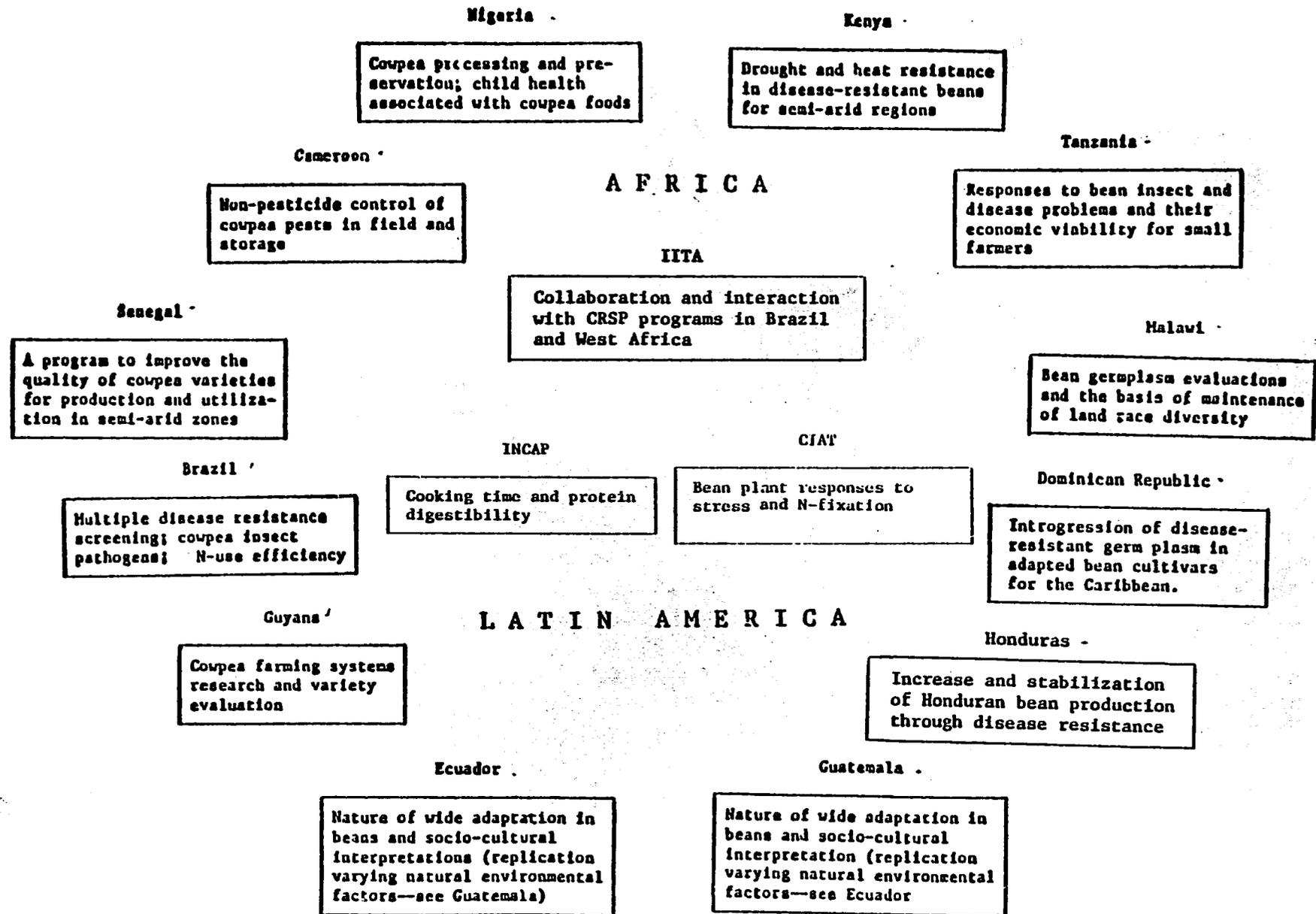
GLOBAL RESEARCH PLAN

BEAN/COWPEA CRSP

Figure 1

SEMI-ARID ZONE

TEMPERATE ZONE



C. Country Programs and Major Constraints

At each point in the process, for both beans and cowpeas, there was concern that the major constraint areas identified must be addressed. Figure 2 is a display of the constraint areas by country giving an indication of the global distribution of the constraint area research. It should be kept in mind that the categories presented are quite broad and several checks within the same category do not necessarily represent the same work.

For example, while both Cameroon and Senegal are slated to do research on cowpea pests, Cameroon is interested specifically in non-pesticide, experimental pest control work with appropriate cooperation with the biological pest control program of the AID funded Crop Protection Service. Their work will include insect life cycle evaluations in relation to multicropping patterns. They are also concerned with the labor demands on the cowpea farmers, traditionally mostly women, and the contribution of the experimental methods to the labor constraints. Senegal, on the other hand, will concentrate on screening and breeding varieties that are resistant to drought and heat as well as pests. Entomological work will include economic assessment of traditional pest control practices. They are interested in the role of multicropping and other farming practices on pest resistant variety performance as a part of a total drought, heat, pest resistant effort.

As previously indicated, a shortage of trained personnel was a major problem in all the countries. Even though some were considerably better off than others, all indicated an interest in increasing research capability through the education of selected students.

39

COUNTRY PROGRAMS MATCHED AGAINST MAJOR CONSTRAINTS
Figure 2

COUNTRY PROGRAMS CONSTRAINT AREAS	Malawi (B)	Tanzania (B)	Kenya (B)	Nigeria (C)	Cameroon (C)	Senegal (C)	Dominican Republic (B)	Honduras (B)	Guatemala (B)	Ecuador (B)	Guyana (C)	Brazil (IITA) (C)	INCAP (B)	CIAT (B)
Limitations Due to Pests and Diseases		✓			✓	✓	✓	✓			✓	✓		
Plant Response Limitations	✓	✓	✓			✓	✓	✓	✓	✓		✓		✓
Limitations of the Physical Environment	✓		✓			✓					✓	✓		✓
Farming Practices Limitations		✓	✓		✓	✓	✓	✓			✓			
Storage Problems				✓	✓								✓	
Production-Consumption Economics		✓		✓										
Nutrition, Food Preparation and Health				✓		✓							✓	
Socio-Cultural Factors	✓		✓	✓	✓				✓	✓	✓			
Education, Training and Research Capability	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

P A R T I V

MANAGEMENT ENTITY:
ORGANIZATION AND PROCEDURES

MANAGEMENT ENTITY
ORGANIZATION AND PROCEDURES

Based on guidelines previously received, the Planning Team developed a plan for Management Entity Organization and Procedures. As soon as the Joint Research Committee approvals were received, U.S. institutions approved for Bean/Cowpea CRSP involvement were drawn into the process.

A. Approved U.S. Bean/Cowpea CRSP Institutions

At its April, 1980 meeting, the Joint Research Committee of the Board for International Food and Development approved the following institutions for major involvement in the Bean/Cowpea CRSP:

1. California, University of; Davis and Riverside
2. Colorado State University; Fort Collins
3. Cornell University; Ithaca, New York
4. Georgia, University of; Experiment and Tifton
5. Michigan State University; East Lansing
6. Mississippi State University; Mississippi State
7. Nebraska, University of; Lincoln
8. Puerto Rico, University of; Mayaguez
9. Washington State University; Pullman
10. Wisconsin, University of; Madison

These institutions represent a mix of universities having long-supported programs in either beans or cowpeas, or both, with the personnel interested in and experienced in various aspects of producing and utilizing these crops.

Individuals from these universities have participated previously as consultants in the planning process and were the recent visitors to the

developing country programs during which time the specific collaborative research designs were prepared (Appendix G).

B. Management Entity Responsibilities

The Management Entity, through its Program Management Staff and in conjunction with the CRSP Board of Directors and Technical Committee, shall maintain a comprehensive, integrated Collaborative Research Support Program in beans and cowpeas. ~~As the legal and fiscal administrator of funds provided for the Program, the Management Entity shall assume the following duties:~~

1. ~~Accept total bean/cowpea CRSP funds and responsibility for same.~~
2. Work out with each sub-grantee institution (each of the approved 10) and each sub-contracting institution the structure, process and procedures for the re-allocation of funds.
3. Negotiate with each sub-grantee institution the desired back-stopping to meet guidelines and regulations.
4. Develop detailed budgets with the U.S. and developing country institutions, including 1 year and 2 year budgets.
5. Effect U.S. agency approvals and be prepared to contribute to congressional presentation if required.
6. ~~Effect necessary approvals from host governments and U.S. institutions.~~
7. Continue "fine-tune" planning, assuring the integration of all bean/cowpea CRSP activities into a single total research effort.
8. ~~Meet regularly with the Board of Directors regarding policy decisions.~~
9. ~~Meet periodically with Technical Committee regarding the technical development of the program.~~
10. Receive annual project summaries.
11. In cooperation with sub-grantees, develop evaluation plans, highlighting critical points in the research and indicating appropriate criteria by which to measure progress.

43

12. ~~Cooperate with External Review and Evaluation Committee.~~
13. Cooperate with federal auditors.
14. ~~Facilitate communication, information sharing and feedback among all~~ appropriate parties; U.S. and developing countries, with attention to cross-cultural understandings, communications' translations, and national prerogatives.
15. Confer in advance with each institution regarding travel procedures and regulations and other guidelines to avoid "disallowed" costs to any participating institution. Distribute amendment every six months or as issued.
16. Receive required fiscal documents and facilitate money flow.

C. Program Management Staff

The Bean/Cowpea CRSP will be coordinated by a full time Program Coordinator with executive, technical and fiscal management responsibility. The Coordinator will be assisted by a 1/2 time Assistant Coordinator, a full time Fiscal Officer, and a 1/4 time Women in Development Specialist. This latter position is deemed appropriate because of the dominant position of women in bean and cowpea production in a large number of the B/C CRSP countries. A person to coordinate and review B/C CRSP research activity as it relates to the needs of women in the developing world is of unique importance.

Management Entity Staff

Program Coordinator

Assistant Program Coordinator

Women in Development Specialist

Fiscal Officer

Secretarial Staff

D. Management Entity Designation

At a Bean/Cowpea CRSP development meeting held April 28, 1980 in Chicago attended by two representatives from each of 10 approved U.S.

universities and one representative each from US/AID and BIFAD, Michigan State University was unanimously selected as the institution to be recommended to JRC-BIFAD to serve as Management Entity of the Bean/Cowpea CRSP. In accordance with that decision, the planning team recommends Michigan State University for that post. The organizational structure and procedures for program management are presented below.

E. Board of Directors

The function of the Board of Directors is to establish Bean/Cowpea CRSP policies within the general US/AID and JRC/BIFAD guidelines. All organizational components of the CRSP function under these policies. The Board will be concerned with such issues as total program comprehensiveness, general budgetary levels, representation of appropriate groups at management and project levels and overall operational policy within JRC/AID guidelines.

The Board shall consist of five members, one each from five of the 10 approved U.S. institutions. One of the five member positions shall be permanently assigned to the Management Entity Institution. The other four member positions will rotate regularly among the remaining nine U.S. institutions, the annual rotation schedule to be developed by the Board at its first meeting. Members will serve two year staggered terms. Also at its first meeting the issue of LDC representation on the Board is to be resolved. Such representation is seen as highly desirable but procedures for avoiding severe budget burdens on the program must be addressed.

At the Chicago meeting, the 10 approved institutions voted that the following among them would be the first to serve on the Board:

University of Georgia

University of Nebraska

Cornell University

University of Wisconsin

Michigan State University

112

It will be the responsibility of the respective Deans of Agriculture of these institutions to designate their institutional member to the Board with attention given to sexual representation. It is expected that the persons so appointed will come from within the administrative ranks. However, these appointees will be expected to represent the entire CRSP and not his or her respective institution or discipline.

The initial meeting of the Board will be convened by the Management Entity, at which time the Board will select a Chairperson, adopt rules of operation, establish procedures for rotating membership, and resolve issues concerning LDC representation on the Board, Technical Committee start-up and general management policy.

F. Technical Committee

The Technical Committee will serve as the principal advisory group to the Management Entity on operational matters. It will function as an internal project review and research coordination panel. Specific responsibilities will include the following:

1. Review applicants for the position of program coordinator and make recommendations to the Board of Directors and Management Entity.
 2. Review collaborative research projects to assure that the work undertaken is within the policies and guidelines for the Program, focuses on the agreed upon objectives, and meets professional standards of quality.
 3. Maintain a global overview of the CRSP activities to insure that overall Program research goals are being addressed, integration among relevant areas of work is practiced, and procedures for the exchange of information and materials are established and made operational.
 4. Initiate, receive, review and recommend as appropriate, new research efforts as may be important to the achievement of CRSP goals.
- 4/10

5. Advise the Program Coordinator on technical matters pursuant to the discharge of the management responsibilities.

The Technical Committee will be composed of seven (7) members serving two year staggered terms. Of the seven (7) members, at least four (4) will be selected from participating U.S. institutions, only one (1) on a rotating basis will represent the two International Centers, CIAT and IITA, and at least one (1) will be a representative of developing countries. The members serving on the Committee will be selected by the Board of Directors. The selection process will insure that four (4) of the seven (7) members represent agricultural production disciplines and the remaining three (3) represent other participating disciplines, together reflecting as near as possible the constraint areas addressed by this Program. Members would be expected to broadly represent their disciplinary perspectives in committee review activities.

The Board of Directors will receive nominees from each of the participating institutions with indications of each nominee's affiliation, discipline and qualifications. The Board will then select the seven (7) committee members with strict attention to academic disciplines, institutional distribution and sexual representation.

The Committee initially will be convened by the Management Entity for organizational purposes to select a chairperson, adopt operating rules and procedures, and agree on meeting schedules.

G. External Evaluation Panel

The primary function of the Panel will be to provide an independent external evaluation of the Global CRSP. Recommendations of the Panel will be transmitted to the Management Entity, the Program Coordinator, the Board of Directors, the Technical Committee, JRC, and the Board of International Food and Agricultural Development.

The panel will be composed of no less than three (3) nor more than seven (7) individuals, selected by the Technical Committee in consultation with the Program Coordinator and approved by the Board of Directors. Its members will be chosen broadly from the international community of leading scientists in the agricultural, socio-cultural, economic and related disciplines. With due attention to geographical, commodity and sexual representation, members will be chosen by the Board of Directors with advice and counsel from the Program Director and the Technical Committee.

The panel will convene at stipulated intervals at the request of the Board of Directors upon recommendation of the Technical Committee and Program Coordinator.

4

I. Management Entity First Year Budget

Personnel

Program Coordinator - full time
Assistant Program Coordinator - half time
Women in Development Specialist - 1/4 time
Fiscal Officer - full time
Secretarial Staff

Total \$108,100

Management Entity Meetings - including foreign & domestic travel

Technical Committee
Board of Directors
External Review Panel
Project Review
Principal Coordinators' Group

Total 67,250

Equipment, Supplies and Services 38,800

Indirect Costs 78,577

GRAND TOTAL \$292,727

P A R T V

APPENDICES

A P P E N D I X A

DOCUMENTATION

DOCUMENTATION*

1. Adams, M. W. Bean Consultative Trip Report, Peru. 1968.
2. Adams, M. W. Problems in Bean Production in Venezuela and Research Recommendations. A Consultative Report to FUSAGRI. October-November, 1975.
3. Allen, D. J., of IITA. Beans in Tanzania: A Trip Report. 1979.
4. The American Geographical Society. Africa's Food Producers: The Impact of Change on Rural Women. Vol. XXV, No. 5. January-February 1975.
5. Arroyo, Gonzalo. Institutional Constraints to Policies for Achieving Increased Food Production in Selected Countries. In Proceedings of The World Food Conference of 1976.
6. Barnes-McConnell, P. W. Bean/Cowpea Collaborative Research Support Program Trip Report: Tanzania. 1979.
7. Barnes-McConnell, P. W. Bean/Cowpea Collaborative Research Support Program Trip Report: Grain Legume Workshop, University of the West Indies, Trinidad. 1979.
8. Bedwany, Therese Labib. The Status of Women and Population Control: The Relationship of Gross Reproduction Rate and Selected Indicators of the Status of Women in Developed and Developing Countries. Ph.D. Dissertation. Michigan State University, 1974.
9. Bliss, F. A. Cowpeas in Nigeria. In Protein Advisory Group of the U.N. System Report. 1973.
10. Blumberg, Rae Lesser. Females, Farming and Food: Rural Development and Women's Participation In Agricultural Production Systems. Office of Women In Development, USAID. 1979.
11. Bocanegra, S. and E. Echandi. Proyecto de Incremento de la Produccion de Menestras (in Peru). Ministerio de Agricultura, Servicio de Investigacion y Promocion Agraria (S.I.P.A.) y Mision Agricola de la Universidad del Estado de Carolina del Norte. 1968.
12. Boroson, W. and N. Eberstadt. The International Food Policy Institute. In RF Illustrated. The Rockefeller Foundation. Vol. 4, No. 3. September, 1979.
13. Boulding, Elise. Women in the Twentieth Century World. Chapter on Women and Food Systems. Halsted Press. 1977.
- 14.**Wood, D. R., D. Youmans and D. Lodwick. Bean/Cowpea Collaborative Research Support Program Travel Team Report: Latin America - Colombia, Ecuador, Peru, Brazil. 1979.
15. Bradfield, S., L. O. Copeland and V. Marcarian. Bean/Cowpea Collaborative Research Support Program Travel Team Report: Caribbean and Mexico - Jamaica, Haiti, Dominican Republic, Barbados, Trinidad, Mexico. 1979.

*Revised 11/10/79

**This reference inserted and numbered in this position by error.

5

MINUTES - Meeting with Bean/Cowpea CRSP Planning Grant
Group and Representatives from the Title XII
Institutions Being Recommended for Participation;
Chicago/O'Hare Airport; April 28, 1980

The Joint Research Committee at their April meeting held at the University of Florida - Gainesville, approved the planning entity's recommendation that the following ten institutions be approved as participating institutions for the Bean/Cowpea CRSP:

1. University of Nebraska
2. University of Georgia
3. Washington State University
4. Colorado State University
5. Cornell University
6. University of Puerto Rico
7. University of California
8. Mississippi State University
9. University of Wisconsin
10. Michigan State University

As follow up to the approval of the participating institution Michigan State University (MSU), the planning entity called a meeting for April 28, 1980, for the purpose of (1) to present a preliminary draft of the Bean/Cowpea CRSP global plans, (2) presentation of the proposed management structure and (3) discussion and vote on the management entity for the Bean/Cowpea CRSP.

Representatives from each of the ten participating universities (The universities were instructed to send either "the dean of your colleges of agriculture or the director of your experiment station or an administrator of an international program in agriculture, to represent the administration of your institution. As the second representative, we request you send one technical person, preferable one of the researchers that has been associated with the project"), BIFAD/JRC and A.I.D. were in attendance. (See Attachment I for the Attendance List).

The agenda for the meeting was as follows:

1. Introductions and a brief history of the CRSP planning process.
2. Review of the draft CRSP Global Plan.
3. A discussion on Characteristics of a management entity principle, and experience with the management entity of other CRSPs like research programs.
4. Statements by universities interested in being considered as candidates for the management entity responsibility.
5. Formal selection of the "management entity" institution to be recommended to the JRC.

The formal agenda was preceded by a brief "slide and talk" show by Dr. Pat Barnes-McConnell and Dr. Wayne Adams, planning coordinators from Michigan State University. This interesting presentation covered some of the work which the planning organization had done during their visits to the LDCs. Dr Wayne Adams and

Dr. John Yohe, the A.I.D. project manager for the CRSP, handled the first agenda item. Then Dr. Adams and Dr. McConnell "walked" the group through the draft plan for the Bean/Cowpea CRSP.

Dr. Woods Thomas made a presentation about the management entity concept with some good help from Dr. John Yohe, Bob Kleis, and others who were familiar with what has happened in the Sorghum/Millet CRSP and the Small Ruminant CRSP.

Dr. Woods Thomas chaired the session on the presentation of the statements by interested universities and the voting on the selection of the institutions to be recommended. Prior to the meeting MSU had provided each institution with copies of the "characteristics of a management entity" which had been taken from the JRC guidelines. With this guidance in hand three institutions had expressed prior interest in being considered. These were the University of Wisconsin, Cornell University, and Michigan State University. Early in the discussion of the agenda items dealing with the management entity, the University of Wisconsin announced that it had decided to withdraw its candidacy for consideration as the management entity. Later, Cornell also formally withdrew as a candidate and indicated its support for Michigan State. This left Michigan State as the only institution with expressed interest in taking on the responsibilities of the management entity. As the chairperson, Dr. Thomas specifically called, on three occasions, for other universities to express interest in being considered as a candidate for the management entity if that were, in fact, their desire. No other university

expressed such interest.

The chair accepted a formal motion by Dr. Don Johnson of Colorado State University, and a second from Dr. Joe Metz, of Cornell University, that Michigan State University be recommended to the JRC, BIFAD, and A.I.D. as the institutional "home" of the management entity for the Bean/Cowpea CRSP. A discussion followed during which the group heard Dean Jim Anderson, of Michigan State, express that institution's interest in and willingness to serve the CRSP program as the management entity. Dr. Wayne Adams also spoke to this effect. He responded to several questions relative to Michigan State's policy vis-a-vis such things as overhead, provision of fiscal services, legal services, and the like. The responses were positive and appeared to be well accepted by the group. Dr. Adams also indicated that he personally would not be a candidate for the program director position and that they would conduct an appropriate "search" to identify the best possible candidate for the position.

Following this discussion, the question was called. The chair indicated that each of the ten institutions would cast one institutional vote vis-a-vis the motion on the floor. This was done by a show of hands. Ten institutions voted for the motion; none voted against or abstained. The chair declared the motion to recommend Michigan State University as the management entity for the Bean/Cowpea CRSP to have been unanimously passed by the assembled institutions.

51

The group spent some time discussing the question of the procedure for implementation of the management entity when approved by the BIFAD and A.I.D. In this respect, two things of significance took place.

First, the group recommended to Michigan State that, in view of the fact that some time would elapse between the approval of the CRSP, the making of the grant, and the selection of the program director, it would be desirable for Michigan State to indicate someone to take responsibility as the interim director. This recommendation was accepted by Dean Anderson who indicated that it would be done.

Second, the proposed structure for the management entity provides for a five-person board of directors drawn from the participating Title XII universities. To facilitate the process of implementation, each institution represented was asked to indicate which of the member institutions they would like to see provide the initial set of board members. The group followed the precedent of the Sorghum/Millet CRSP by agreeing that the management entity of Michigan State, if approved by JRC/BIFAD and A.I.D. ought to hold permanent membership on the board. It was agreed that the remaining nine institutions would be voted upon with the four institutions receiving the next high vote being accorded the responsibility of serving on the interim (prior to the CRSP Grant implementation) and initial set of board members. The vote was recorded as follows:

1. Georgia	7
2. Cornell	6
3. Nebraska	6
4. Wisconsin	5
5. Univ. of California	4
6. Washington State	4
7. Colorado	3
8. Mississippi	3
9. Puerto Rico	2

Dr. Darl Snyder, University of Georgia moved approval of Georgia, Cornell, Nebraska, Wisconsin, and Michigan State to provide the interim and initial Board of Directors for the CRSP. Dr. Robert Kleis, University of Nebraska, seconded the motion. The motion was approved unanimously.

This concluded the business of the day and Dr. Woods Thomas adjourned the meeting.

59

BEAN/COWPEA CRSP

DEVELOPMENT MEETING

<u>NAME</u>	<u>PHONE NO.</u>	<u>INSTITUTION</u>
1. John Yohe	(703) 235-1497	DS/AGR/AP
2. Dermot P. Coyne	(402) 472-1126	University of Nebraska
3. R. W. Kleis	(402) 472-2758	University of Nebraska
4. Larry R. Beuchat	(404) 228-7284	University of Georgia, Experiment
5. Darl E. Snyder	(404) 542-7887	University of Georgia, Athens
6. Richard B. Chalfant	(912) 386-3374	Ga. Coastal Plain Exp. Sta. Tifton
7. Matt J. Silbernagel	(509) 876-3454	USDA- Prosser, Washington
8. L. L. Boyd	(509) 335-4563	Washington State University,
9. D. R. Wood	(303) 491-6591	Colorado State Univ. Ft Collins
10. Donald Johnson	(303) 491-6272	Colorado State Univ, Ft Collins
11. J. F. Metz, Jr.	(607) 256-2283	Cornell University, Ithaca, NY
12. D. H. Wallace	(607) 256-3236	Cornell University, Ithaca, NY
13. J. H. Lopez-Rosa	(809) 767-9705	Univ. of P. R. Crop Protection Agric. Exp. Sta., Rio Piedros
14. G. E. Prin	(809) 767-9705	Univ. of P. R., Mayaguez
15. C. O. Qualset	(916) 752-1713	University of California, Davis
16. Glen H. Cannell	(714) 787-3428	University of Calif., Riverside
17. Rodney Foil	(601) 325-5455	Ms. Agric & For, Exp, Station
18. James H. Anderson	(517) 355-0232	Michigan State University
19. R. W. Hougas	(608) 262-3994	University of Wisconsin, Madison
20. Fred Bliss	(608) 262-1492	University of Wisconsin, Madison
21. W. H. Gabelman	(608) 262-6150	University of Wisconsin, Madison
22. Woods Thomas	(317) 494-8753	BIFAD
23. Pat Barnes-McConnell	(517) 355-4693	Michigan State
24. M. W. Adams	(517) 355-2234	Michigan State

FROM: THE JOINT RESEARCH COMMITTEE (JRC) GUIDELINES
FOR
COLLABORATIVE RESEARCH SUPPORT PROGRAM (CRSP)

Characteristics of a Management Entity

For each CRSP, an administrative "Management Entity," with appropriate legal status, not necessarily a corporation, will be required for administering the resources contributed by A.I.D. and for overseeing the individual projects comprising the program. This management entity would receive and administer A.I.D. grant funds for the CRSP and enter into sub-grants or contracts with collaborating U.S. and developing-country institutions for their respective projects, according to the program plan. The management entity should have the capacity to coordinate the effective implementation of the program and be responsible for effecting implementation of the budgetary plans, including the contributions of the participating institutions to their projects.

The management entity might be a U.S. university, an administrative unit within a university, a special consortium of universities, or other body representing the participating institutions. A federal agency would not serve as a management entity.

A.I.D. funds for a given CRSP would flow from A.I.D. to the management entity, and from that entity to each collaborating institution. (Normally, contributions by a participating institution would be made directly to that institution's project under the CRSP and would not be transferred to the management entity. This does not, however, preclude the right of the management entity to receive and administer such funds when mutually agreed.) A.I.D. would, nevertheless, hold the management entity responsible for performance of the CRSP. A.I.D. would assure that the management entity would manage the program in accordance with the overall plan and budget agreed to by A.I.D. and the management entity. The JRC will, through BIFAD, assist A.I.D. in the management of all these activities by such continuing evaluational and other program development and monitoring mechanisms as may be evolved. Similarly, A.I.D. would hold the management entity accountable for the funds and for their appropriate use in all aspects of the CRSP; and this entity would, in turn, hold the participating institutions and other collaborating institutions accountable for the funds and for their use in the projects according to budgetary plans. A suitable system of accountability would be developed between the management entity, the participating universities and A.I.D. for holding participating institutions accountable for use of A.I.D. funds in, and assuring their own contributions to, their projects. Such a management system is essential for efficient management of a number of participating institution projects comprising a CRSP. This administrative mechanism facilitates tight coordination of activities of several collaborating institutions, makes available a diversity of scientific talent, and assures that all necessary disciplinary and institutional components of a CRSP will be integrated into a comprehensive effort.

61

16. Building a Better Future: Responding to World Food Needs. New Ways Quarterly. The Charles F. Kettering Foundation. Summer, 1979.
17. Burton, Glenn W. Overcoming Constraints and Realizing Potentials in the Physical and Biological Aspects of Feeding People. In The Proceedings of the World Food Conference of 1976.
18. Buvinic, Mayra and Nadia Youssef. Women Headed Households: The Ignored Factor in Development. USAID Office of Women in Development. 1978.
19. Cannell, Glen H., M. J. Silbernagel and W. Mwangi. Bean/Cowpea Collaborative Research Support Program Travel Team Report: East Africa - Kenya, Tanzania, Malawi, Botswana, Zaire--also Nigeria. 1979.
20. Castillo, Galia T. The Farmer Revisited: Toward a Return to the Food Problem. In the Proceedings of the World Food Conference of 1976.
21. Chinn, Dennis L. Farmer Response to Foodgrain Controls in Developing Countries. Quarterly Journal of Economics. Vol. 92, #4. p. 697-703. 1978.
22. CIAT Bean Program Annual Report. 1978.
23. Cliffe, Lionel. The Social Sciences and Agricultural Development in Tanzania. In Mbilinyi, S. M. Editor. Agricultural Research for Rural Development. 1973.
24. Cooper, St. G. C. Agricultural Research in Tropical Africa. East African Literature Bureau. 1970.
25. Crosson, Pierre. Relations between Food Production Processing and Distribution Alternatives and Energy. In The Proceedings of the World Food Conference of 1976.
26. Davis, John Michael. The Impact of Rural Electrification in Costa Rica. Ph.D. Dissertation. The University of Florida, 1974.
27. deMooy, Jack C., Richard L. Fery and Edward K. Tapsoba. Bean/Cowpea Collaborative Research Support Program Travel Team Report: West Africa - Upper Volta, Niger, Cameroon, Nigeria, Senegal. 1979.
28. Dexter, S. T., A. M. Chaves, O. T. Edje. Preserving Small Lots of Grain for Seed or Food. Institute for International Agriculture, Michigan State University, Misc. #5.
29. Dixon, Ruth B. Women's Employment in the Context of Agrarian Reform and Rural Development: A Review of Programs and Policies. USAID Office of Women in Development. 1979.
30. Ensminger, Douglas. Constraints to Millions of Small Farmers in the Developing Countries Risking Changes in Farming Practices and Family Living Patterns. In The Proceedings of the World Food Conference of 1976.

31. Fandino, Mario. Rural Out-migration in Colombia. Ph.D. dissertation. The University of Wisconsin-Madison. 1975.
32. FAO Plant Production and Protection Paper #9, Breeding Objectives in Food Legume Crops. 1977.
33. FAO. Food Legumes in the Caribbean, Central America and Panama - Status and Possibilities. A report Submitted to Regional Office for Latin America by the Caribbean Agricultural Research and Development Institute, St. Augustine, Trinidad. August, 1978.
34. FAO. The Missing Half: Woman 1975. Eliograf - Rome. Rome, Italy. 1975.
35. Ferguson, T. U. Research Programme on Cowpea: A Proposal. University of the West Indies, Trinidad. 1979.
36. Fischer, John L. An Illustrative Developing Country Strategy for Meeting Basic Food/Nutrition Needs. Available from USAID Office of Women in Development.
37. Gibbons, C. A., D. C. Catt, R. C. Hankin, J. D. MacArthur and P. B. Gravel. The Problem of Collecting Data on Food Production and Farming in African Economics. Comox (B.C.), Peter McLoughlin Associates, Ltd. 1974.
38. Gilligan, John J., Administrator USAID. Address to Partners of the Americas Conference, Santo Domingo. 1977.
39. Graham, P. H. Some Problems and Potentials of Field Beans (Phaseolus vulgaris L.) in Latin America. Field Crops Research 1. 1978.
40. Guerrero, Solon Joseph. Structural and Individual Components of Change in a Brazilian Agricultural Situation. Ph.D. dissertation. Ohio State University, 1973.
41. Habit, Mario A. The Need to Increase Food Legume Production, as seen by highly qualified specialists. A compendium of special reports by individuals and/or organizations. Regional Plant Production and Protection Officer, FAO, Santiago, Chile; December, 1977. Authors include the following:
 - Dr. M. Jalil
 - Joint FAO/ECLA Division
 - Protein Advisory Group of the U.N.
 - Dr. K. O. Rachie
 - Dr. Riccardo Bressani
 - Dr. Ronald Peterson
 - Dr. Mario Habit
 - Dr. Ronald Echandi
 - Dr. Lewis Roberts
42. Huston, Perdita. Third World Women Speak Out. Praeger. 1979.
43. IITA Annual Report. 1976.
44. Jaffe, Werner G. Factors Affecting the Nutritional Value of Beans. In Protein Advisory Group of the U.N. System Report. 1973.

63

45. Kreysler, J. Rational Development of an "Under-Fives' Clinic" Network. In Mbilinyi, S. M., Editor. Agricultural Research for Rural Development. 1973.
46. Lappe, Francis Moore and Joseph Collins. World Hunger Ten Myths. Institute for Food and Development Policy, 2588 Mission Street, San Francisco, California, USA 94110. 1979.
47. Lele, Uma. The Design of Rural Development: Lessons from Rural Africa. John Hopkins University Press. Baltimore and London, 1975 (for the World Bank).
48. Leng, Earl R. Analytical and Mass Screening Techniques (Chemical, Biochemical, Toxicological, Nutritional) - Research needed. In Protein Advisory Group of the U.N. System Report. 1973.
49. Liener, Irvin. Summary and research needed on Protein and Amino Acid Profiles, Antitryptic and Other Toxic Factors, Flatulence, and Processing and Food Acceptance Problems. In Protein Advisory Group of the U.N. System Report. 1973.
50. Liener, I. E. The Nutritional Significance of Plant Protease Inhibitors. Proceedings of the Nutrition Society; Symposium on Anti-nutritional Factors. Edinburgh, 1978.
51. Leonard, David K. Reaching the Peasant Farmer: Organization Theory and Practice in Kenya. University of Chicago Press. 1977.
52. Lunven, Paul. Research Needed in Nutritional Importance of Legumes for Humans. In Protein Advisory Group of the U.N. System. 1973.
53. Majisu, B. N. Ministry of Agriculture, Nairobi, Kenya. 1979.
54. Manetsch, Thomas J. On the Role of Systems Analysis in Aiding Countries Facing Acute Food Shortages. IEEE Transactions on Systems, Man and Cybernetics. Vol. SMC-7, #4. April 1977.
55. Mbilinyi, S. M., Editor. Agricultural Research for Rural Development. Proceedings of the African Academy. Vol. 9. 1973.
56. McLoughlin, Peter F. M. Studying African Agriculture. In Mbilinyi, S. M., Editor. Agricultural Research for Rural Development. 1973.
57. McMaster, David N. Rural Development and Economic Growth: Kenya. Focus, The American Geographical Society. Vol. XXV, No. 5. January-February, 1975.
58. McQuigg, James D. Climatic Constraints on Food Grain Production. In Proceedings of The World Food Conference of 1976.
59. Migot-Adholla, S. E. Migration and Rural Differentiation in Kenya. Ph.D. dissertation. UCLA. 1977.
60. Ministry of Agriculture and Natural Resources. Guide to Agricultural Production in Malawi. 1970-71.

64

61. Monsonis, James A. Single Nations with Multiple Societies: An evaluation of the significance of the concept of social and cultural pluralism for understanding economic development in the third world. Ph.D. dissertation. New School for Social Research. 1976.
62. Mook, Joyce L. The Content and Maintenance of Social Ties Between Urban Migrants and their Home-based Support Groups: The Maragoli Case. African Urban Studies. No. 3. Winter, 1978-79.
63. Mulili, M. Some Practical Hints for Social Interviewers - Guidelines for Interviewing. University of Nairobi, Kenya. July, 1978.
64. Nduguru, B. J. Phaseolus Research in Tanzania: A proposal. University of Dar es Salaam, Faculty of Agriculture, Morogoro, Tanzania. 1979.
65. Newman, Mark, Ismael Ouedraogo and David Norman. Farm Level Studies in the Semi-Arid Tropics of West Africa. Paper presented at ICRISAT Workshop on Socio-economic Constraints to Development of Semi-Arid Tropical Agriculture. February, 1979.
66. Noury, Mostafa Mostafa. The Impact of the Individual and Rural Community Variables on the Adoption of New Farm Practices in Rural Egypt. Ph.D. dissertation. Iowa State University, 1973.
67. Norman, David W., David H. Pryor and Christopher J. N. Gibbs. Technical Change and the Small Farmer in Hausaland, Northern Nigeria. African Rural Economy Paper #21, 1979. Department of Agricultural Economics, Michigan State University.
68. Obeng, Henry B. Natural Resources, Currently Available for Crop and Animal Production with Particular Reference to West Africa. In The Proceedings of the World Food Conference of 1976.
69. Ogliastri-Urbe, Enrique. Elite, Class, Power, and Social Consciousness in the Economic Development of a Colombia City; Bucaramanga. Ph.D. dissertation. Northwestern University, 1973.
70. O'Kelly, Elizabeth. Intermediate Technology as an Agent of Change. In the Proceedings of the World Food Conference of 1976.
71. Okigbo, Bede N. Plant Technology in Today's World and Problems of Continued Widespread Adoption in Less Developed Countries. In The Proceedings of the World Food Conference of 1976.
72. Olembo, R. J. Environmental Issues in Current Food Production, Marketing and Processing Practices. In The Proceedings of the World Food Conference of 1976.
73. Oram, P. Status and Potential for Genetic Improvement of Food Legumes - Discussant. In Protein Advisory Group of the U.N. System Report. 1973.
74. Pala, Achola O. African Women in Rural Development: Research Trends and Priorities. Overseas Liaison Committee, American Council on Education. Paper #12. 1976.

75. Problematica de la Planta, INIA, Mexico. 1979.
76. Programa Nacional de Frijol, INIA, Peru. 150 p. April, 1979.
77. Protein Advisory Group of the United Nations System Report. Nutritional Improvement of Food Legumes by Breeding. United Nations, N.Y. 1973.
78. Puritt, Paul. Arusha District Development Plan. In Mbilinyi, S.M., Editor. Agricultural Research for Rural Development, 1973.
79. Rachie, K. O. and L. M. Roberts. Grain Legumes of the Lowland Tropics. Advances in Agronomy, Vol. 26, Academic Press, Inc. San Francisco, 1974.
80. Rachie, K. O. Improvement of Food Legumes in Tropical Africa. In Protein Advisory Group of the U.N. System Report. 1973.
81. Report of the Integrated Grain Legume Improvement Program. University of Nairobi. 1977.
82. Ritchie, Jean A. S. Impact of Changing Food Production, Processing and Marketing Systems on the Role of Women. In The Proceedings of the World Food Conference of 1976.
83. Rogers, Barbara. The Role of Women in Rural Development: A Survey of the Roles of Women in Ghana, Lesotho, Kenya, Nigeria, Bolivia, Paraguay and Peru. (Westview Special Studies in Social, Political, and Economic Development, Boulder, Colorado. 1977) Published in cooperation with Development Alternatives, Inc., Washington, D.C.
84. Rojas-Ruiz, Humberto. Peasant Consciousness in Three Colombian Rural Communities. Ph.D. dissertation. The University of Wisconsin, Madison. 1974.
85. Rondinelli, Dennis A. Administration of Integrated Rural Development Policy: The Politics of Agrarian Reform in Developing Countries. World Politics. Vol. 31, #3. 1979.
86. Rubaihao, P. R. A Review of the Status of Grain Legumes in Uganda. Verlag Paul Parey. Berlin and Hamburg. 1978.
87. Sanders, Thomas G. The Plight of Mexican Agriculture. In American University Field Staff Reports: #3, 1979.
88. Schmitt, Bernard A. A Cross-Section Analysis Integrating Nutritional Variables with the Economic Relationships of Developing Countries. Ph.D. dissertation. The Florida State University. 1977.
89. Simmons, Emmy B. Economic Research on Women in Rural Development in Northern Nigeria. Overseas Liaison Committee, American Council on Education. Paper #10. 1976.
90. Singh, Raghbir. A Behavioral Contingency Theory of Adoption and Diffusion of Agricultural Technology in Less Developed Countries. Ph.D. dissertation. Ohio State University. 1973.

66

91. Spencer, Dunstan S. C. African Women in Agricultural Development: A Case Study in Sierra Leone. Overseas Liaison Committee, American Council on Education, Paper #9. June, 1976.
92. Sprague, Ernest W. and Keith W. Finlay. Current Status of Plant Resources and Utilization. In The Proceedings of the World Food Conference of 1976.
93. Staudt, Kathleen. Women Farmers and Inequities in Agricultural Services. USAID Office of Women in Development. 1976.
94. Stevens, Helene and Anne-Marie Jeay. Femmes D' Afrique et des Pays Mediterraneans Sociologia Ruralis. Vol. 18, #4. P. 235-244. 1978.
95. Tahbazzadeh, Parizad. Stratification and Adoption of Agricultural Innovations Among Costa Rican Farmers. Ph.D. dissertation. Michigan State University, 1975.
96. Tinker, Irene and Michele Bo Bramsen. Women and World Development. Overseas Development Council. 1976.
97. Title XII Bean/Cowpea CRSP Planning Office, Identification of Constraints - Questionnaire and Interview. In Interim Planning Report of the Bean/Cowpea Collaborative Research, Appendix III. Department of Crop and Soil Sciences. Michigan State University. May 15, 1979.
98. UNICEF. Village Technology in Eastern Africa. Regional Seminar on Appropriate Technology for the Rural Family. 1976.
99. Vieira, Clibas. National Bean Program of Brazil, Objectives and Priorities. Federal University of Vicosa. November 14, 1972.
100. Wallace, D. H. Adaptation of Phaseolus to Different Environments. Cornell University. 1979.
101. Winkelman, Donald L. Promoting the Adoption of New Plant Technology. In The Proceedings of the World Food Conference of 1976.
102. Wittenbarger, Robert Lee, Ph.D. Socio-Economic Change in Three Colombian Small Farm Communities: A Panel Study. Ph.D. dissertation. The University of Wisconsin-Madison, 1974.
103. Wittwer, Sylvan H. Alternatives Available for Improving Plant and Animal Resources. In The Proceedings of the World Food Conference of 1976.
104. Workshop: Physical Resources for Food Production. The World Food Conference of 1976.
105. Workshop: Impacts on People. In The Proceedings of the World Food Conference of 1976.
106. Workshop: Selection and Use of Technologies. In The Proceedings of the World Food Conference of 1976.

67

107. Workshop: Consumer Policies. In The Proceedings of the World Food Conference of 1976.
108. Workshop: Institutional Resources. In The Proceedings of the World Food Conference of 1976.
109. Workshop: Maintaining and Improving Resources. In The Proceedings of the World Food Conference. 1976.
110. Worthington, E. B. Arid Land Irrigation in Developing Countries. In Geographical Journal.
111. Yousef, Nadia Haggag. Women and Work in Developing Societies. Greenwood Press. Westport, Connecticut. 1974.

68

DOCUMENTATION
(Addendum)
4-18-80

1. Rubaihayo, P.R., Mulindwa, D., Sengooba, T. and Kamugira, F. Bean Production in Uganda. Paper presented at the Regional Workshop on Potentials for Field Beans in Eastern Africa held in Lilongwe, Malawi, March 9-14, 1980.
2. Njungunah, S.K., Ndegwa, A.M.M., van Rheenen, H.A. and Mukunya, D.M. Bean Production in Kenya. Paper presented at the Regional Workshop on Potentials for Field Beans in Eastern Africa held in Lilongwe, Malawi, March 9-14, 1980.
3. Karel, A.K., Ndunguru, B.J., Price, M., Semuguruka, G.H., and Singh, B.B. Bean Production in Tanzania. Paper presented at the Regional Workshop on Potentials for Field Beans in Eastern Africa in Lilongwe, Malawi, March 9-14, 1980.
4. Edje, O.T., Mughogho, L.K., Rao, Y.P. and Msuku, W.A.B. Bean Production in Malawi. Paper presented at the Regional Workshop on Potentials for Field Beans in Eastern Africa held in Lilongwe, Malawi, March 9-14, 1980.
5. Dieudonne, C. Beans in Burundi. Report of potentials of Bean Production in East Africa, Lilongwe, Malawi, March 9-14, 1980.
6. Chibasa, W.M., Chungu, R.K. and Naik, D.M. Zambia: Country Report presented at the Eastern African Workshop on Potentials for Field Beans in Eastern Africa, Lilongwe, Malawi. March 9-14, 1980.
7. Bartlett, C.D.S. Farm Information in the Design of Improvements for Small-Scale Agriculture. With Special Reference to Beans in Lowland Areas of Morogoro Region, Tanzania. Rural Economy Research Paper No. 6. 4-78. Department of Rural Economy Faculty of Agriculture, Forestry and Veterinary Science. University of Dar Es Salaam, Morogoro, Tanzania
8. Nyabyenda, Pierre, Sekanabanga, Claudien and Nyangurundi, Laurent. Rapport Presente Par Le Rwanda. Seminaire sur les Potentialites du Haricot En Afrique Orientale, Malawi, 9-14 Mars 1980.

A P P E N D I X B

MAJOR PLANNING OFFICE DECISIONS:
TASKS, GROUPS AND CRITERIA
PLANNING GROUP PARTICIPANTS

TASKS, GROUPS AND CRITERIA

Tasks and Group	Recommendation Criteria
<u>U.S. Proposal Evaluations</u> by Peer Review Panel	<ol style="list-style-type: none">1. must address one or more of the problems on the list of LDC endorsed constraints to small farm production of bean or cowpeas in LDC's;2. must address constraints to greater usage of beans or cowpeas by the poor in LDC's;3. must address socio-cultural/socio-economic constraints to acceptance and adoption of improved technology; and4. the inclusion, with any of the above, of a personnel training component.5. must be ranked as desirable or as essential to a comprehensive, balanced, and integrated bean/cowpea CRSP6. must reflect the principal investigator's <u>and</u> the sponsoring institution's demonstrated (past) and/or current capabilities for successful implementation;7. must reflect a potential, either in the short term or long term, for solving or contributing to the solution of the target constraint;8. must give an indication that the proposed research will lead to effective linkages between the U.S. institution(s) and scientist(s) and their counterparts in the LDC's;9. must provide evidence, in its suggested procedures, that appropriate work will be carried out in the LDC's;10. must provide for significant involvement of LDC personnel in the collaborative linkage; and11. must indicate that approximately 50% of the CRSP funding will be spent in the LDC's.
<u>U.S. Institution Selection</u> by the Planning Office with advice from the Developing Country Advisory Group and other U.S. advisors	<ol style="list-style-type: none">1. a demonstrated capability of its staff to provide competent professional guidance and consultation across several disciplines important to the bean/cowpea CRSP;2. a commitment of the institution to the overall objectives of Title XII;3. a demonstrated interest and capability of the institution to conduct and/or manage international program in agriculture;

U.S. Institution Selection
by the Planning Office
with advice from the
Developing Country
Advisory Group and
other U.S. advisors
(continued)

4. a previous and/or present involvement in bean/cowpea research;
5. the relevance of the bean/cowpea CRSP proposals, submitted from eligible institutions, to the identified constraints;
6. a capability and commitment of the institution to make available the support services necessary for CRSP success, e.g. language training, etc.;
7. experience in the designated region and willingness of regional LDC institutions to accept the institution.

Collaborating Country
Selection by the
Planning Office
with advice from
the Developing
Country Advisory
Group

1. expression of interest at primary level from AID mission and potential host country
2. some minimal level of research infrastructure (facilities and personnel) with which Bean/Cowpea CRSP could collaborate
3. country agricultural priorities and activity related to this research
4. demographic characteristics which would make a unique contribution to the total comprehensive requirements of the Global Plan
5. AID mission indication that country concerned with areas written in AID/JRC guidelines (small farmer, role of women, etc.)

PLANNING GROUP PARTICIPANTS

August, 1978 - Experiment Station Representatives, Chicago

<u>Experiment Station Representative</u>	<u>Designated Researcher</u>	<u>Experiment Station Representative</u>	<u>Designated Researcher</u>
U. CALIF.-DAVIS Dr. Charles E. Hess	Dr. Carl Tucker	UNIV. OF NEBRASKA Dr. H. W. Ottoson	Dr. Dermot Coyne
COLORADO STATE U. Dr. Wayne Keim	Dr. Donald Wood	CORNELL U. (NEW YORK) Dr. Donald Barton	Dr. Donald Wallace
UNIV. OF FLORIDA	Dr. Mark Bassett	OREGON STATE UNIV. Dr. J. R. Davis	Dr. David Mok
UNIV. OF IDAHO	Dr. L. E. O'Keefe	UNIV. OF PUERTO RICO Dr. Raul Abrams	Dr. Julio Lopez-Rosa
MICHIGAN STATE U. Dr. S. H. Wittwer	Dr. M. W. Adams	UNIV. OF WISCONSIN Dr. Glenn Pound	Dr. Fred Bliss
UNIV. OF MINNESOTA Dr. Signe Betsinger	Dr. Mark Brenner		

April-May, 1979 - Fact-finding Team Visits

South America:	Dr. Donald Wood Colorado State U.	Mr. David Youmans Washington State U.	Ms. Dora Lodwick Mich. State Univ.
Caribbean & Mexico:	Dr. S. Bradfield Kalamazoo College	Dr. V. Marcarian Univ. of Arizona	Dr. L. O. Copeland Mich. State Univ.
West Africa:	Dr. C. J. deMooy Colorado State U.	Dr. R. L. Fery U.S.D.A. Charleston, S.C.	Mr. Edouard Tapsoba Ouagadougou, Upper Volta
East Africa:	Dr. Glenn Cannell U. Cal.-Riverside	Dr. M. Silbernagel USDA/SEA/AR, IAREC Prosser, Washington	Dr. Wilfred M'Wangi College of Agriculture U. of Nairobi, Kenya

June, 1979 - International Peer Review Panel and Advisory Group, East Lansing

Dr. A. Crispin-Medina INIA Mexico 1, D.F.	Dr. Clibas Vieira U. Fed. De Viscosa Minas Gerais, Brasil	Dr. Lewis Roberts 702 Ellen Lee Ct. Bryan, Texas	Dr. L. Butler Washn. Res. & Ext. Cen. Puyallup, Washington
Dr. R. J. Summerfield Plant Environment Lab. U. of Reading, England	Dr. D. McCloud Agronomy Univ. of Florida	Dr. Frank Byrnes Rockefeller Fdn. New York City	Dr. Olaf Mickelson Food Sci. & Hum. Nutr. Michigan State Univ.
Dr. Donald Wallace Plant Breeding Cornell Univ.	Dr. Peter Graham CIAT Cali, Colombia	Dr. Dermot Coyne Horticulture Univ. of Nebraska	Dr. Wayne Adams Crop & Soil Sciences Michigan State U.
Dr. J. C. Miller Horticulture Texas A & M U.	Dr. Kay McWatters Food Science Univ. of Georgia	Dr. A. Pinchinat IICA Santo Domingo, D.R.	Dr. Pat Barnes-McConnell Crop & Soil Sciences Michigan State Univ.
Dr. Blake Brantley Horticulture Univ. of Georgia	Dr. H. Lionberger Rural Sociology Univ. of Missouri		Dr. Shiv Singh Plant Breeding Cornell Univ. & IITA

7

October, 1979 - Developing Country Advisory Group, East Lansing

Dr. T. U. Ferguson Crop Science U. of West Indies	Dr. G. Leite Da Silva-Dias EMBRAPA - CNPAF Goiania, Goias, Brazil	Dr. C. N. Karue University of Nairobi Nairobi, Kenya
Dr. Peter Graham CIAI Cali, Colombia	Dr. Antonio Pinchinat IICA Santo Domingo, Dominican Republic	Dr. Peter Goldsworthy IITA Ibadan, Nigeria
Dr. Chris Wien Vegetable Crops Cornell Univ.	M. Emil T. Mmbaga, Grad. Student Michigan State Univ. (Sponsored by Tanzanian Min. Agr.)	Dr. John Yohe Grain Legume Agronomist USATO, Washington, D.C.
Dr. M. W. Adams B/C Planning Office Mich. State Univ.	Dr. Pat Barnes-McConnell B/C Planning Office Michigan State Univ.	Dr. Donald H. Wallace B/C Planning Office Cornell Univ.

December, 1979 - U.S. Institutions Approved for Further Planning
Representatives, East Lansing

Dr. M. W. Adams Crop & Soil Sciences Michigan State Univ.	Dr. C. J. deMooy Agronomy Colorado State U.	Dr. Kay McWatters Food Science U. of Georgia	Dr. Barry Swanson Food Sci., Tech. Washington St. U.
Dr. Pat Barnes-McConnell Crop & Soil Sciences Michigan State Univ.	Dr. Jean Due Agricultural Econ. Univ. of Illinois	Dr. David Mok Horticulture Oregon State U.	Dr. Varriano-Marston Grain Sci. & Ind. Kansas State U.
Dr. G. H. Cannell Soil & Env. Sciences U. Cal.-Riverside	Dr. W. H. Gabelman Horticulture Univ. of Wisconsin	Dr. Luke Mugwira Nat. Res. & Env. Alabama A & M U.	Dr. Donald Wallace Plant Breeding Cornell Univ.
Dr. H. R. Capener Rural Sociology Cornell Univ.	Dr. D. J. Hagedorn Plant Pathology Univ. of Wisconsin	Dr. M. Rangappa SEA/CR/USDA Virginia State U.	Dr. B. D. Webster Agron. & Range Sci. U. Cal.-Davis
Dr. Dermot Coyne Horticulture Univ. of Nebraska	Dr. C. F. Konzak Agronomy & Soils Washington State U.	Dr. L. D. Satterlee Food Sci. & Tech. Univ. of Nebraska	Mr. J. Zapata-Acosta Ag. Econ. & R. Soc. Univ. of Puerto Rico
Dr. A. Wayne Cole Plant Path. & Weed Sci. Mississippi State U.	Dr. J. Lopez-Rosa Agr. Experiment Sta. Univ. of Puerto Rico	Dr. Richard Soper Boyce Thompson Inst. Ithaca, New York	

March - April, 1980 - U.S. Research Team Representatives to host
countries to meet with potential collaborators

Dr. M. W. Adams Crop & Soil Sciences Michigan State Univ.	Dr. Jean Due Agr. Economics Univ. Illinois	Dr. George Hosfield Crop & Soil Sci. Michigan State U.	Dr. Barry Swanson Fd. Sci. & Tech. Washington St. U.
Dr. Cyril Akpom Community Health Sci. Michigan State Univ.	Dr. George Freytag USDA/ARS Mayaguez, Puerto Rico	Dr. Richard Hughes Plant Research Boyce Thompson Inst.	Dr. J. G. Waines Bot. & Plant Sci. U. Cal.-Riverside
Dr. Pat Barnes-McConnell Crop & Soil Sciences Michigan State Univ.	Dr. Peter Gore SUNY Plattsburgh Chazy, New York	Dr. J. Lopez-Rosa Agr. Exper. Station U. of Puerto Rico	Dr. D. H. Wallace Plant Breeding Cornell Univ.
Dr. Larry Beauchat Food Science Univ. of Georgia	Dr. D. J. Hagedorn Plant Pathology Univ. of Wisconsin	Dr. V. Marcarian Plant Sciences Univ. of Arizona	Dr. B. Webster Agronomy & RangeSci. U. Cal.-Davis
Dr. Richard Chalfant Entomology Univ. of Georgia	Dr. A. E. Hall Bot. & Plant Sci. U. Cal.-Riverside	Dr. Luke Mugwira Nat. Res. & Env. St. Alabama A & M U.	Ing. C. Chiriboga Legumes Prog., INIAP Quito, Ecuador
Dr. C. J. deMooy Agronomy Colorado State U.	Dr. Woodrow Hare Pl. Path. & Wd. Sci. Mississippi State U.	Dr. M. Silbernagel USDA/SEA/AR, IAREC Prosser, Washington	Dr. G. R. Ammerman Horticulture Mississippi State U.

April, 1980 - Approved U.S. Bean/Cowpea Institutions CRSP Development Meeting, Chicago

		<u>Administrative Representative</u>	<u>Technical Representative</u>
Univ. of Calif.	B/C*	Dean Calvin Qualset - Davis Assoc. Dean, College of Ag. & Environmental Sci.	Dr. G. Cannell-Riverside Soil & Environmental Sci.
Colorado State U.	B/C	Dr. Donal D. Johnson College of Agr. Sciences	Dr. Donald Wood Agronomy
Cornell Univ.	B	Dr. J. F. Metz, Director International Agriculture	Dr. Donald Wallace Plant Breeding
Univ. of Georgia	C	Dr. Darl Snyder, Director International Development	Dr. Richard Chalfant Entomology and Dr. Larry Bouchat Food Science
Michigan State U.	B	Dean James Anderson College of Agr. & Natural Resources	
Mississippi State U.	C	Dr. R. R. Foil, Director Mississippi Agr. & Forestry Experiment Station	
Univ. of Nebraska	B	Dr. R. W. Kleis, Dean of International Programs and Assoc. Dir. of Nebraska Agr. Experiment Station	Dr. Dermot Coyne Horticulture
U. of Puerto Rico	B	Dr. George Pringle Assistant Director Experiment Station	Dr. Julio Lopez-Rosa Crop Protection
Washington State U.	B	Dr. Landis Boyd, Director Agr. Research Center	Dr. M. J. Silbernagel USDA, Prosser, Washington
Univ. of Wisconsin	B	Dr. Robert Hougas, Director Experiment Station	Drs. F. Bliss and W. Gabelman Horticulture

BIFAD/JRC

Dr. Woods Thomas
Past Executive Director
BIFAD

Dr. John Yohe, Acting Chief
Agricultural Production
Office of Agriculture, USAID

Bean/Cowpea Planning Office

Dr. M. Wayne Adams
Dr. Pat Barnes-McConnell

*As indicated by each institution's administrator at the CRSP Development Meeting 4/28/80

A P P E N D I X C

EXAMPLES
of
PEER PANEL EVALUATION DOCUMENTS
for
U.S. PROPOSAL REVIEW

BEAN/COWPEA CRSP PROPOSAL EVALUATION FORMS

NAME _____

STATUS: Panelist or Advisor

PROFESSIONAL ADDRESS:

PHONE:

HOME ADDRESS:

PHONE:

4/11

INSTRUCTIONS FOR REVIEWING PROPOSALS

1. Summary of the Research Proposal.

The Planning Office has provided on page 1, a summary of the identified (CRSP Assigned No.) proposal. This summary is an abbreviated encapsulation of the Principal Investigator's own words. These abbreviated encapsulations are for the areas (see summary on page 1) of: (1) potential LDC collaborator(s), (2) proposed activity in LDCs, (3) research-training objectives, (4) experimental materials and/or subjects, (5) experimental methods, and (6) subject matter area and objectives.

2. Reviewer Evaluation of the Research Proposal.

A. Improve on the Planning Office-provided summary.

With the complete proposal in hand, you should check it against the encapsulation and add, delete or modify as seems appropriate to you.

B. Philosophy

The final Bean/Cowpea Collaborative Research Support Program should emphasize, as much as the state of expertise permits, collaboration and activities with LDC personnel and also training of LDC research personnel. It should include training U.S. students for future Bean/Cowpea research and collaboration with LDCs, and it should include appropriate basic research and socio-economic research.

C. General comments, suggested modifications and subjective scorings.

Space for the reviewer's general comments, suggested modifications and for subjective scores of six or seven facets (A thru I) of the proposal is provided on the summary sheet (page 1) to the right of the encapsulated summaries. The unused space on the back of the summary sheet may be used to continue your statements, i.e., your comments or suggested modifications.

D. Subjective scoring.

To facilitate easy comparison of the subjective scores of different reviewers, we suggest that all use the scoring procedure as given for A thru I on the back of this page. Expansions of the concepts to be evaluated for A thru I are as follows:

- (A.) As per your own judgment, score the priority of the subject matter area for inclusion in the Bean/Cowpea CRSP plan. Peer panel reviewers and advisors may delay this until discussion of the desired complete and balanced plan has occurred.
- (B.) As per your own judgment, score the past involvement of the principal investigator and/or institution in LDC activities that are pertinent to the CRSP. This must come directly from the proposal; this is not encapsulated on the summary sheet. Comments about your evaluation will be in order.
- (C.) As per your own judgment, score the commitment to LDC linkages as you perceive it from the linkages suggested within the proposal (not encapsulated on the summary sheet.)
- (D.) As per your judgment, score the potential contribution to training of LDC personnel for doing research, assuming the proposal is implemented as suggested by the principal investigator. Use the proposal directly and also the summary sheet to draw your conclusions. You should suggest proposal modifications which would strengthen the effectiveness of the research-training benefit to the LDCs.
- (E.) As per your judgment, indicate the ultimate potential contribution from the proposal toward improving LDC teaching and extension capabilities.
- (F.) Some proposals may be near-identical in subject matter area, objectives, etc. But, there will inevitably be differences. To help you identify similar proposals, please note the following information contained in the CRSP-assigned proposal number.

- B the proposal is for work on Beans.
- C the proposal is for work on Cowpeas.
- BC the proposal is for work on Beans and Cowpeas.

- I. Fertility, Plant Nutrition and Environment)
- II. Farming Practices and Management) The Roman numeral(s)
- III. Genetic Limitations) indicates the
- IV. Plant Pests) constraint area(s)
- V. Utilization and Storage) addressed.
- VI. Socio-cultural and Socio-economic)

From the above information it can be discerned, for example, that Proposal B-I-III-3 is for work on beans (B) in the constraint grouping of Fertility, Plant Nutrition and Environmental limitations (I). The proposal is also concerned with the constraint grouping of Genetic Limitations (III). The number 3 indicates this is the third proposal that was so classified. Complete identity or dissimilarity of the subject matter area to be researched by two or more proposals must be determined by comparing the Subject Matter Areas and Objectives as given on the summary sheet, or better by direct comparison of the proposals.

- (G.) You, or the collective group of peer reviewers, may decide that some non-indicated criterion is important. Enter it here and score as indicated.
- (H.) Recommendation: Indicate your final recommendation for incorporation or non-inclusion of this proposal in the Bean/Cowpea CRSP. Your suggested modifications should be stated in the space provided on the front or back of the summary sheet.
- (I.) Same as G.

PLEASE USE THE FOLLOWING SCORING PROCEDURES:

	<u>Range of Scores</u>	<u>Enter your score in the space at the right (on the summary page) of each (A-I) column.</u>
A. Priority of Subject matter area	1-5	1 = minimum or very low priority, and 5 = maximum or highest priority
B. Past involvement in LDC activities	1-5	1 = minimal involvement 5 = maximal involvement
C. Capability & commitment to LDC linkages	1-5	1 = minimal linkage proposal 5 = maximal linkage proposal
D. Potential contribution to LDC research-training	1-5	1 = minimal training of LDC researchers 5 = maximal training of LDC researchers
E. Potential contribution to LDC teaching and extension	1-5	1 = minimal 5 = maximal
F. Relative rank among similar proposals	1--The No. of similar proposals	1/3 = lowest of three) two or more 5/5 = highest of 5) may have equal rank, or be complementary
G. ?? Use this space for a criterion not given above	1-5	1 = minimal merit for CRSP 5 = maximal merit for CRSP
H. Recommendation:	Acc or Mod or Non	Acc = (Acceptance of Proposal for inclusion in CRSP plan) Mod = (Modification(s) are suggested) Non = (Rejection; non-inclusion in the CRSP plan)
I. ?? As for G. above.		

79

CRSP Assigned Proposal No. B-1-111-6	<u>Constraint Area (I thru VI)</u>		<u>Proposal Title</u> (Page 1)	<u>Subject Matter Area & Objectives</u> Efficient Utilization of Phosphorus <u>Primary objectives:</u> 1) Transfer P efficiency and inefficiency two commercial cultivars. 2) Select among the efficient and inefficient versions of each cultivar for lines that respond to high P efficiency and lines that do not respond. 3) Field test the few combinations (efficient users responders vs. non-responders) in fields with low P. 4) Combine the above characteristics with N fixing and non-fixing genotypes and test in fields. 5) Continue search for even more P efficient germplasm. 6) Determine the mechanisms of differential P efficiency and response.	A. Priority of Subject matter area B. Past involvement of LDC activities C. Capabilities & commitment to LDC linkage D. Potential contribution to LDC selection-breeding E. Potential contribution to LDC teaching and extension F. Relative rate among similar proposals G. Recommendation: (Circle 1-5) Acc. (Assistance) Mod. (Modification) Not. (Non-Initiation)
	I. Fertility, Plant Nutrition, Environment III. Genetic Limitations		Synthesis and Evaluation of Beans Efficient in Phosphorus Utilization		
<u>Source of Proposal</u>			<u>Yearly Budget</u>	<u>Research-Training Objectives</u> Graduate student training. Sabbatic-type stays of LDC scientists at University of Wisconsin	
<u>Principal Investigator(s)</u>		U.S. Institution(s)	\$88,493; 25% from Wisconsin; None to be spent in LDCs <u>at this time</u>		
W. H. Gabelman		Univ. of Wisconsin Dept. of Horticulture	<u>Experimental Materials and/or Experimental Subjects</u> Phosphorus efficient vs. inefficient genotypes; Phosphorus responding vs. non-responding genotypes; nitrogen fixing vs. non-fixing genotypes.		
G. C. Gerloff		Botany			
<u>Potential LDC Collaborator LDC Scientist(s)</u>			<u>General Comments From Reviewers</u>		
Dr. P. Graham		CIAT, Colombia Microbiologist	<u>Experimental Methods</u> Crossing and backcrossing to incorporate all phenotypes into two varieties, followed by testing in LDC fields that have low phosphorus		
Prof. F. A. A. Couto		EMBRAPA, Brazilia, Brazil			
<u>Proposed Activities in LDCs</u> After three years, when the combinations of P efficient vs inefficient x P responders vs non-responders have been developed, the plant material will be tested in LDCs.			<u>Suggested Modifications or Additional Comments</u> Please label as comment or modification.		

Continue on other side of page if needed.

Continue on other side of page if needed.

CRSP Assigned Proposal No. B-III-IV-2	<u>Constraint Area (I thru VI)</u> III. Genetic limitations IV. Plant pests	<u>Proposal Title</u> Development of multiple disease resistant beans for the tropics. Annual budget: \$496,859; other details not given.	<u>Subject Matter Area & Objectives</u> 1) Develop recurrent selection populations (RSPs) in specific groups of <i>Phaseolus Vulgaris</i> for high frequency of major and minor genes for multiple disease resistances. 2) Select, test and release advanced lines for combined multiple disease resistance, yield & commercial potentials. 3) Develop RSPs in closely related <i>Phaseolus</i> species (<i>P. coccineus</i> , others) for important disease resistances not presently found in the common bean, specifically, bacterial blight (<i>Xanthomonas</i> sp.), angular leaf spot, soybean rust and BCMV. 4) Maintain the network of cooperators in LDCs and of interested principal bean scientists in the US who are willing to receive and use disease resistant germ plasm, and participate in trials of improved disease resistant germ plasm (advanced lines, cultivars) in the principal bean production areas. 5) Provide training in Puerto Rico to cooperators and students from LDCs. 6) Hold workshops whereby US scientists and scientists and cooperators from the tropics may meet to discuss and work on timely subjects.	A. Priority of Subject matter area B. Past involvement in LDC activities C. Capability & commitment to LDC linkages D. Potential contribution to LDC research-training E. Potential contribution to LDC teaching and extension F. Relative rank among similar proposals G. H. Recommendation: (Circle 1 or 2) Acc. (Acceptance) Mod. (Modification) Non. (Non-inclusion)		
<u>Source of Proposal</u> <table border="1"> <tr> <td data-bbox="34 446 273 803"> <u>Principal Investigator(s)</u> J. Lopez-Rosa G. Freytag </td> <td data-bbox="273 446 541 803"> <u>U.S. Institution(s)</u> Univ. of Puerto Rico USDA, Mayaguez </td> </tr> </table>		<u>Principal Investigator(s)</u> J. Lopez-Rosa G. Freytag	<u>U.S. Institution(s)</u> Univ. of Puerto Rico USDA, Mayaguez	<u>Research-Training Objectives</u> Short term training; M.S. degree training; post doctoral, sabbatic opportunities.		<u>Suggested Modifications</u> or <u>Additional Comments</u> Please label as comment or modification.
<u>Principal Investigator(s)</u> J. Lopez-Rosa G. Freytag	<u>U.S. Institution(s)</u> Univ. of Puerto Rico USDA, Mayaguez					
<table border="1"> <tr> <td data-bbox="34 803 273 1144"> <u>Potential LDC Collaborator</u> LDC <u>Scientist(s)</u> Staff More than 15-20 collaborators suggested. </td> <td data-bbox="273 803 541 1144"> <u>LDC Institution(s)</u> CIAT, Colombia PCCMCA IICA-CATIE </td> </tr> </table>		<u>Potential LDC Collaborator</u> LDC <u>Scientist(s)</u> Staff More than 15-20 collaborators suggested.	<u>LDC Institution(s)</u> CIAT, Colombia PCCMCA IICA-CATIE	<u>Experimental Materials and/or Experimental Subjects</u> Beans with disease resistance.	<u>General Comments From Reviewers</u>	
<u>Potential LDC Collaborator</u> LDC <u>Scientist(s)</u> Staff More than 15-20 collaborators suggested.	<u>LDC Institution(s)</u> CIAT, Colombia PCCMCA IICA-CATIE					
<u>Proposed Activities in LDCs</u> Activities to be on Univ. of Puerto Rico campuses.		<u>Experimental Methods</u> Recurrent selection procedures will be used to accumulate the many disease resistance into commercially acceptable types. Detailed procedures are given for each objective.				

Continue on other side of page if needed.

Continue on other side of page if needed.

CRSP Assigned Proposal No. R-IV-111-1	<u>Constraint Area (I thru VI)</u> IV Plant Pests III Genetic Limitations	<u>Proposal Title</u> (Page 1) Bacterial Blights of Dry Beans; Epidemiology, Genetics and Breeding for Resistance	<u>Subject Matter Area & Objectives</u> Bacterial blights of beans <u>Specific objectives:</u> a) to detect and characterize genetic variability, pathogenesis, population dynamics, and host-parasite relations; b) to study effects of biotic and abiotic factors on epidemiology; c) to produce disease-free seed; d) to identify resistant genotypes to different bacterial strains and determine genetic control; e) to investigate genetic control of morphological and physiological components of resistance; f) to investigate and use effective breeding systems for multiple resistance.	A. Priority of B. Subject matter area C. Past involvement in LDC activities D. Capability & commitment to LDC activities E. Potential contribution to LDC research-training F. Potential contribution to LDC teaching and extension G. Relative rank among similar proposals H. Recommendation: (Circle 1 or 2) Acc. (Acceptance) Mod. (Modification) Non. (Non-consideration)
<u>Source of Proposal</u> <u>Principal Investigator(s)</u> D. P. Coyne M. L. Schuster		<u>Research-Training Objectives</u> LDC graduate students will be trained at Nebraska; their thesis research could be done in the LDC's.		
<u>Potential LDC Collaborator</u> <u>LDC Scientist(s)</u> Dr. K. Yoshii Dr. S.H. Orozco Dr. N. Valladares Dr. H. Leyna Temple & Schwartz		<u>Experimental Materials and/or Experimental Subjects</u> Germplasm with different genes for resistance to blights and with resistance to different strains of blight. Varied strains of the bacterial pathogens. Genotypes with multiple disease resistances from CIAT.		<u>Suggested Modifications</u> or <u>Additional Comments</u> Please label as comment or modification.
<u>Proposed Activities in LDCs</u> Cooperation will be with LDC scientists. Establish test plots with cooperators in LDC's and evaluate pathogen management systems including rotation, clean seed production, bacterial survival and multiple resistant germ plasm or advanced breeding populations.		<u>Experimental Methods</u> The different plant genotypes will be tested against the different bacterial strains and the disease symptoms and pathogenicities tested and the genetics of the resistances studied. Breeding strains that will give more stable forms of resistance will be used. Survival mechanisms of the pathogens will be followed.	<u>General Comments From Reviewers</u>	Continue on other side of page if needed.

CRSP Assigned Proposal No. C-I-III-1	<u>Constraint Area (I thru VI)</u> I. Fertility, plant nutrition, environment III. Genetic limitations.	<u>Proposal Title</u> (Page 1) Systematic Improvement of Yield in Cowpeas in LDC's with Emphasis on Drought Resistance.	<u>Subject Matter Area & Objectives</u> Drought resistance, yield in cowpeas Objectives: 1. Investigate variability within cowpeas for drought tolerance. 2. Determine the drought tolerance of lines from cooperating LDC and U.S. institutions. 3. Conduct on-site trials on small farms in dry-tropic LDC's. 4. Characterize the physiological nature of drought tolerance. 5. Devise a diagnostic index suitable for use in LDC's.	A. Priority of Subject matter area B. Peak involvement in LDC activities C. Capacity & commitment to LDC Director D. Potential contribution to LDC research-training E. Potential contribution to LDC teaching and extension F. Interest rate among similar proposals G. H. Recommendation: (Circle 1 or 2) Acc. (Acceptance) Mod. (Modification) Not. (Non-consider)
<u>Source of Proposal</u> Principal Investigator(s) V. Marcarian A. K. Dobrenz Cooperators: K. Rawal C. L. Tucker		<u>U.S. Institution(s)</u> Univ. of Arizona Dep. of Plant Sciences Univ. of Colorado Univ. of California	<u>Research-Training Objectives</u> Graduate students, postdoctoral fellows, and senior LDC scientists will function in the project. Senior LDC scientists will be given sabbatic privileges at Arizona. They will do the work with drought tolerant materials in the LDC's.	<u>Suggested Modifications</u> or <u>Additional Comments</u> Please label as comment or modification.
<u>Potential LDC Collaborator</u> LDC Scientist(s) Dr. E. E. Watt Cowpea scientists Open		<u>U.S. Institution(s)</u> IITA - Brazil (associated with EMBRAPA) IITA - Nigeria Open	<u>Experimental Materials and/or Experimental Subjects</u> Heat and salt-tolerant lines from U. of Arizona. Photoperiod insensitive lines from U. of Cal. Night-temperature-insensitive lines from Colorado State. Symbiotically efficient lines from Texas. Elite lines from IITA and other LDC locations.	<u>General Comments From Reviewers</u> Continue on other side of page if needed.
<u>Proposed Activities in LDCs</u> Graduate students and post-doctorate will work in LDC's.		<u>Experimental Methods</u> An Arizona-located, continuous-irrigation gradient system in which 300 entries x 2 replicates of cowpea cultivars or 600 entries x one replicate can be evaluated under 5.6 cm to 76.0 cm of water for the growing season. In subsequent years photosynthesis, respiration and nitrogen fixation, and heat and salt tolerances will be assayed. The best selected lines will be used as parents for a breeding program and made available to all institutions.	Continue on other side of page if needed.	Continue on other side of page if needed.

Assigned Proposal No. C-III-I-1
 III - Genetic Limitations
 I - Environment

Source of Proposal
Principal Investigator(s)
 A. E. Hall
 K. E. Foster
U.S. Institution(s)
 University of California (Riverside)
 Dept. of Botany & Plant Sciences
 Botany & Plant Sciences

Potential LDC Collaborator
LDC Scientist(s)
 M. Thiello
 C. Dancette
 T.P. Singh
 K.L. Buhr
LDC Institution(s)
 Senegalese Institute for Agricultural Research; Ialiar, Senegal
 IITA, Nigeria
 IITA, Upper Volta
 Brazil/Rockefeller

Proposed Activities in LDCs
 The PIs will visit cowpea institutions in Africa and South America. The research will have cooperative programs in Senegal, Nigeria, Upper Volta, Brazil and possibly other LDCs.

Project Title
 Cowpea (Vigna unguiculata L. Walp.)
 Varietal Improvement for Semiarid Zones
 Annual budget \$199,558; 27% from UCR; 10% to be spent in LDC.

Research-Training Objectives
 To train scientists in agronomy, plant physiology, genetics, plant breeding. To train these scientists to contribute to rural development in LDCs through course work and experience with the research project at UCR. Senior LDC scientists will spend sabbaticas at UCR. PIs will provide short training sessions.

Experimental Materials and/or Experimental Subjects
 Cowpea varietal development

Experimental Methods
First Year: Visits to Senegal, develop plans for cooperation; exchange germplasm, discuss breeding methods & selection criteria, Expand research at UCR to develop character selection tests. Develop further systems for evaluating yield stability.
Second Year: The systems for selecting developed at UCR will be initiated in LDCs and supported through pass through funds. Crosses be made between genotypes from Senegal and California
 (over)

Project Objectives and Goals
Overall objectives: To develop improved cowpea cultivars for semiarid zones.
Long Term Goal: To provide agricultural systems to farmers in semiarid zones that will ensure their livelihood and ability to produce adequate food supplies irrespective of variations in weather and economic conditions.
Specific Objectives: 1) Develop screening tests for earliness, heat resistance at flowering, drought tolerance and improved root and shoot characteristics. 2) Incorporate these characteristics into suitable backgrounds. 3) Apply successful screening tests in California and encourage use of these procedures in LDCs. 4) Develop disease lines and populations having novel combinations or adoptive characteristics using parental material developed in difficult climate zones. 5) Evaluate in fields in semiarid Africa, South America, and California, using advanced but appropriate management methods.

General Comments From Reviewers

- A. Priority of subject matter area
- B. Past involvement of LDC activities
- C. Capability & commitment to LDC linkages
- D. Potential contribution to LDC research-training
- E. Potential contribution to LDC teaching and extension
- F. Relative rank among similar proposals
- G.
- H. Recommendation: (Circle 1 or 2)
 Acc. (Acceptance)
 Mod. (Modification)
 Non. (Non-inclusion)

Suggested Modifications or Additional Comments
 Please label as comment or modification.

Continue on other side of page if needed. Continue on other side of page if needed!

CRSP Assigned Proposal No. C-V-VI-1

Constraint Area (I thru VI)
 V. Utilization and Storage
 VI. Socio-cultural and Economic

Proposal Title (Page 1)
 Village-Scale Process for Production of Cowpea Flour

Subject Matter Area & Objectives
 • Cowpea flour production in villages
Overall objective: To increase use of cowpeas by rural and urban consumers in West Africa.
Specific objectives are to develop methods to:

Source of Proposal
Principal Investigator(s)
 K. H. McWalters
 R. D. Phillips
 L. F. Flora
 M. S. Chhiman
 R. E. Worthington

U.S. Institution(s)
 Univ. of Georgia
 Food Science Dept.

Research-Training Objectives
 1. To transfer the technology to developing countries by cooperative work with scientists in West Africa and by training a Nigerian graduate student and by involvement of socio-economists.

- Specific objectives are to develop methods to:
1. Destroy insects in field dried, shelled peas and prevent reinfestation before milling.
 2. Mill to a flour while maintaining nutritional and functional properties.
 3. Package at acceptable cost.

Potential LDC Collaborator LDC Scientist(s)
 Dr. P. Ngoddy
 C. E. Williams

LDC Institution(s)
 University of Ife Nigeria
 Univ. of Ibadan, Nigeria
 Dept. Agr. Economics and Extension

Experimental Materials and/or Experimental Subjects
 Cowpeas to be milled into flour, and the milled flour incorporated into traditional fofos. Varieties used will be native to West Africa.

General Comments From Reviewers

Proposed Activities in LDCs
 Duplicate equipment will be used in Univ. of Georgia and an LDC lab. After three years the process will be expanded to include social scientists and extension personnel, and perhaps entrepreneurs to commercialize the process.

Experimental Methods
 Various methods of removing skins and eyes and destroying insects will be tested. Flours that include the skins will also be made and all will be organoleptically and functionally evaluated by incorporation into the native dish akara. Storage methods will be tested. Nutritional quality will be evaluated.

Continue on other side of page if needed.

- A. Priority of Subject matter area
- B. Peas involvement in LDC activities
- C. Capabilities & commitment re LDC languages
- D. Forensic consultation
- E. Forensic consultation re LDC teaching and extension
- F. Relative rank among similar proposals
- G.
- H. Recommendation: (Circle 1 or 2)
 Acc. (Acceptance)
 Mod. (Modification)
 Non. (Non-Submission)

Suggested Modifications or Additional Comments
 Please label as comment or modification.

Continue on other side of page if needed.

CRSP
Assigned
Proposal
No.

Constraint Area (I thru VI)

IV Plant Pests
VI Socio-Economic

HC-1V-VI-1

Proposal Title

(Page 1)

Pest and Disease Control for Multi-Cropping Bean/Coupea Production Systems

Subject Matter Area & Objectives

Pest and Disease Control
Overall objective: To determine effect of insects, nematodes, bacterial and fungal diseases on bean/coupea multi-cropping production systems, and evaluate effects of control practices on crop yield and socio-economic conditions of small farmers in the West Indies.

Long term goal: To develop an understanding of the interactions of pests and diseases in a bean/coupea multi-cropping system and to develop pest control program designed, to optimize yields and economic returns, hereby improving the social and educational aspects of the community.

Source of Proposal

Principal Investigator(s)

A. P. Elliot

G. W. Bird
R. F. Ruppel
A. W. Saettler

U.S. Institution(s)

Michigan State Univ.
Entomology
Entomology
Botany & Plant Pathology

Research-Training Objectives

- (1) Graduate level training
- (2) Extension-type-training

Experimental Materials and/or Experimental Subjects

Bean and Coupea Experimental and farmer fields.

Potential LDC Collaborator LDC Scientist(s)

Dr. C. Braithwaite

Dr. J. E. Edmunds

U.S. Institution(s)

Univ. of West Indies
St. Augustine,
Trinidad
Windward Islands
Banana Research Center, St. Lucia,
W. I.

General Comments From Reviewers

Experimental Methods

A survey of the insects, nematodes, bacteria and fungi will be conducted on selected experimental and farm sites.

Financial and economic analysis will be done using project worth measures of benefit/cost ratio, net present worth, and internal rate of return criteria, and based on questionnaires.

A. Priority of Subject matter area	
B. LDC involvement in LDC activities	
C. Capability & commitment to LDC linkages	
D. Potential contribution to LDC research-training	
E. Potential contribution to LDC teaching and extension	
F. Relative rank among similar proposals	
G.	
H. Recommendation: (Circle 1 or 2): Acc. (Acceptance) Mod. (Modification) Non. (Non-Selection)	

Suggested Modifications or Additional Comments

Please label as comment or modification.

Proposed Activities in LDCs

Almost all of this work will be in the West Indies.

Continue on other side of page if needed.

Continue on other side of page if needed.

CRSP Assigned Proposal No. UC-VI-2	<u>Constraint Area (I thru VI)</u> VI Socio-cultural and Socio-Economic	<u>Proposal Title</u> (Page 1) Some Aspects of Socio-Economic Constraints. Bean/Cowpeas - Africa	<u>Subject Matter Area & Objectives</u> 1. Inadequate availability of credit to small farmers. 2. Incentives lacking for small farmers 3. Small farmer family sociology not understood. 4. The role of women who do 60% of all farming and assist with the other 40%.	<table border="1"> <tr><td>A. Priority of Subject matter areas</td></tr> <tr><td>B. Past involvement in LDC activities</td></tr> <tr><td>C. Capacity & commitment to LDC linkage</td></tr> <tr><td>D. Research contribution to LDC research-training</td></tr> <tr><td>E. Research contribution to LDC teaching and extension</td></tr> <tr><td>F. Relative rank among similar proposals</td></tr> <tr><td>G.</td></tr> <tr><td>H. Recommendation: (Circle 1 or 2) Acc. (Acceptance) Mod. (Modification) Not. (Non-submission)</td></tr> </table>	A. Priority of Subject matter areas	B. Past involvement in LDC activities	C. Capacity & commitment to LDC linkage	D. Research contribution to LDC research-training	E. Research contribution to LDC teaching and extension	F. Relative rank among similar proposals	G.	H. Recommendation: (Circle 1 or 2) Acc. (Acceptance) Mod. (Modification) Not. (Non-submission)
A. Priority of Subject matter areas												
B. Past involvement in LDC activities												
C. Capacity & commitment to LDC linkage												
D. Research contribution to LDC research-training												
E. Research contribution to LDC teaching and extension												
F. Relative rank among similar proposals												
G.												
H. Recommendation: (Circle 1 or 2) Acc. (Acceptance) Mod. (Modification) Not. (Non-submission)												
<u>Source of Proposal</u> <table border="1"> <tr> <td><u>Principal Investigator(s)</u> J.M. Due</td> <td><u>U.S. Institution(s)</u> Univ. of Illinois Dept. Agr. Economics</td> </tr> <tr> <td><u>Potential LDC Collaborators</u> D.T. Etad</td> <td><u>Min. of Econo. Planning</u> Buea, Cameroon</td> </tr> <tr> <td><u>Staff</u> Dr. F. Kimaïou D. Adjat-Twain</td> <td><u>Univ. of Yaounde</u> Agricultural Economics <u>Univ. of Ghana, Legon</u> <u>Univ. of Ghana</u> Dept. of Vegetable-Crops</td> </tr> </table>		<u>Principal Investigator(s)</u> J.M. Due	<u>U.S. Institution(s)</u> Univ. of Illinois Dept. Agr. Economics	<u>Potential LDC Collaborators</u> D.T. Etad	<u>Min. of Econo. Planning</u> Buea, Cameroon	<u>Staff</u> Dr. F. Kimaïou D. Adjat-Twain	<u>Univ. of Yaounde</u> Agricultural Economics <u>Univ. of Ghana, Legon</u> <u>Univ. of Ghana</u> Dept. of Vegetable-Crops	<u>Research-Training Objectives</u> Would cooperate with the LDC people as fully as possible to support them and strengthen their institutions.		<u>Suggested Modifications</u> on <u>Additional Comments</u> Please label as comment or modification.		
<u>Principal Investigator(s)</u> J.M. Due	<u>U.S. Institution(s)</u> Univ. of Illinois Dept. Agr. Economics											
<u>Potential LDC Collaborators</u> D.T. Etad	<u>Min. of Econo. Planning</u> Buea, Cameroon											
<u>Staff</u> Dr. F. Kimaïou D. Adjat-Twain	<u>Univ. of Yaounde</u> Agricultural Economics <u>Univ. of Ghana, Legon</u> <u>Univ. of Ghana</u> Dept. of Vegetable-Crops											
<u>Potential LDC Collaborator</u> <table border="1"> <tr> <td><u>LDC Scientist(s)</u> Faculty P. Rubahyo E. Rubahyo Dr. H. Kalpscheer M. Fivawo J. Samboja</td> <td><u>LDC Institution(s)</u> Makerere University Kampala, Uganda Research Station, Kampala ITA Economist, Niger Tanzanian Ministry & Agriculture Univ. of Dar es Salaam</td> </tr> </table>		<u>LDC Scientist(s)</u> Faculty P. Rubahyo E. Rubahyo Dr. H. Kalpscheer M. Fivawo J. Samboja	<u>LDC Institution(s)</u> Makerere University Kampala, Uganda Research Station, Kampala ITA Economist, Niger Tanzanian Ministry & Agriculture Univ. of Dar es Salaam	<u>Experimental Materials and/or Experimental Subjects</u> The PI has done such studies in Tanzania, Zambia and Sudan since 1974.	<u>General Comments From Reviewers</u> Dr. Due only learned of the Bean/Cowpea CRSP about two weeks before submitting this tentative proposal.	Continue on other side of page if needed.						
<u>LDC Scientist(s)</u> Faculty P. Rubahyo E. Rubahyo Dr. H. Kalpscheer M. Fivawo J. Samboja	<u>LDC Institution(s)</u> Makerere University Kampala, Uganda Research Station, Kampala ITA Economist, Niger Tanzanian Ministry & Agriculture Univ. of Dar es Salaam											
<u>Proposed Activities in LDCs</u> The PI will oversee and participate in data collection in the LDCs. LDC scientists and LDC graduate students will also participate.		<u>Experimental Methods</u> Existing data will be pulled together and additional data gathered to fill the gaps. There is need for these socio-economic areas to be more integrated with additional constraints.	Continue on other side of page if needed.	Continue on other side of page if needed.								

A P P E N D I X D

DEVELOPING COUNTRY ADVISORY GROUP MEETING:
WORK DOCUMENTS (1 through 6)

83

BEAN/COWPEA CRSP WORK DOCUMENT 1 (IDENTIFICATION)

Name _____

Representing Region _____

Please review Planning Document A. On the basis of your knowledge of your region, write your region in under "Geographic Area" below, next to problems you know to be major ones in your region. Indicate the types of research you feel would be appropriate for finding solutions to these problems under "Suggested Solutions". List as many different types of research as you wish.

<u>Constraint</u>	<u>Problem</u>	<u>Geographic Area</u>	<u>Suggested Research Solutions</u>
I	A. Problems of chemical or physical properties of soil		
	B. Deteriorating land quality (erosion, compaction, etc.)		
	C. Water inadequate or excessive, especially during most critical time & temperature		
	D. Temperatures too high or too low		
	E. Nitrogen fixation & phosphorous use efficiency		
	F. Wide variations in soils, climates, elevations, environmental resources with a given country		
	G. Molybdenum requirements		
	H. Altitude effects		
	I. Sources of firewood for cooking rapidly being depleted		
	J. Inadequate or non-existent irrigation facilities		

LIMITATIONS OF THE PHYSICAL ENVIRONMENT

<u>Constraint</u>	<u>Problem</u>	<u>Geographic Area</u>	<u>Suggested Research Solutions</u>
II	A. Insects in soils		
	B. Insects in seedlings		
	C. Insects in foliage		
	D. Insects - stem boring		
	E. Insects - pod boring		
	F. Animals or birds destroy crops		
	G. Fungal diseases		
	H. Bacterial diseases		
	I. Viral diseases		
	J. Nematodes		
	K. Weeds inadequately controlled		
	L. Insects have become resistant to insecticides		
	M. General pests and disease problems		
	N. Development of integrated pest management strategies: Chemical, biological, cultural, social		
	O. Disease resistant screening techniques needed		
P. Relationship of pest damage to plant stages and zonal influences			
Q. Factors affecting infection, multiplication and distribution of disease organisms			

PLANT PESTS AND DISEASES

00

Constraint

Problem

Geographic Area

Suggested Research Solutions

III

- A. Low fertilizer response
- B. Yields strongly affected by wind and weather
- C. Low/non-nodulation at the farm level
- D. Other crops more productive
- E. Cultivars not adapted (daylength, temperature, etc.)
- F. Poor competitiveness in intercropping
- G. Inherent yield potential too low - especially in favored varieties
- H. Maturity, length of growth cycle
- I. Sensitivity to drought and/or cold
- J. Instability of performance
- K. Assemble and evaluate indigenous germ plasm collections - germ plasm exchange
- L. Physiological studies: plant efficiency, limitation of sinks, abscission, photo-respiration, etc.
- M. Poorly structured plant types characterized by: long vegetative phase preceding flowering and continuing through reproductive phase, large leaf area index, low ratio of seed to non-seed portions, self-shading, too viny and prostrate, plant architecture
- N. Nitrogen fixation problems including effects of high soil temperatures
- O. Sensitivity to lodging

(cont. next page)

PLANT RESPONSE LIMITATIONS

Constraint

Problem

Geographic Area

Suggested Research Solutions

III
(cont.)

P. Water use efficiency

Q. Plant nutrition & mineral efficiency

In 232 bean fertilization trials in Brazil responses were noted in following frequencies:
N - 67 times, P - 103, K - 15, lime - 31, micro-nutrients - 17

R. Fertility trials and mineral toxicity

S. Climatic zonal contribution to plant, rhizobial responses

PLANT RESPONSE LIMITATIONS

92

Constraint

Problem

Geographic Area

Suggested Research Solutions

FARMING PRACTICES AND MANAGEMENT

IV

- A. Livestock waste used for other than fertilizer
- B. Low stand establishment
- C. Yield losses during growing season
- D. Harvest losses
- E. Seed quality (pathogens, saprophytes, physical)
- F. Farmers do not use modern measures to control diseases and pests
- G. Developed technologies are inappropriate
- H. Herbicide tolerance in mixed cropping systems
- I. Mixed cropping constraints and suitability
- J. Management (especially as it relates to small farms): tillage methods, rhizobial systems, timing, populations and spacial arrangements, utilization patterns
- K. Understanding of farmers' reasons lacking
- L. Fertilizer practices inadequate or indiscriminate relative to zone
- M. Indiscriminate use of insecticides
- N. Criteria for choice of varieties
- O. Land preparation untimely and inadequate
- P. Hand harvesting
- Q. Constraints of monoculture

Constraint

Problem

Geographic Area

Suggested Research Solutions

PRODUCTION/CONSUMPTION ECONOMICS

- V. A. Economics of fertilizer availability -- use and response
- B. Land is not available
- C. Modern inputs are too costly
- D. Equipment not available or too costly
- E. Controlling insects is uneconomical
- F. Pesticides unavailable or can't afford them
- G. Risks are inherent in trying new technology
- H. New techniques not financially feasible
- I. Inadequate availability of credit and inadequate skill in use.
- J. Incentives lacking
- K. Farmers adapt modern technology to other crops but not to beans
- L. Farmers get only a small share of the retail market price
- M. Marketing
- N. Socio-political-economic systems limit the small farmer
- O. Small farmers have no political power - need cooperatives but not trusted
- P. Economics of nutrition
- Q. Assessment of governmental economic infrastructure: input supply, credit availability, extension support
- (cont. next page)

120

Constraint Problem

Geographic Area

Suggested Research Solutions

VI

A. Post-harvest losses

B. Seeds become too hard when kept too long

C. Maintenance of nutritive value in storage

D. Appropriate "village" technology for storage
responsive to unique conditions but
frequently inadequate

E. Diseased seed or pest infested

STORAGE AND COMMODITY MAINTENANCE

Constraint

Problem

Geographic Area

Suggested Research Solutions

VII

- A. Home processing difficulties
- B. Beans cause problems as a food for young children
- C. Ease of cooking - takes too much fuel
- D. Low protein digestibility
- E. Low methionine or methionine availability
- F. Tannin content
- G. Gastro-intestinal or other disease limit human activity
- H. Grain nutritional quality & assessment on living organisms
- I. Antimetabolites & flatulence
- J. Heat treatment, toxicity & nutritive values
- K. Dietary habits inadequate - amino acid assessment
- L. Seed quality and size relative to yield and nutritive value
- M. Malnutrition & nutrition needs
- N. Scarce firewood for cooking

NUTRITION, FOOD PREPARATION AND HEALTH

119

Constraint

Problem

Geographic Area

Suggested Research Solutions

VIII

- A. Beans are not a preferred crop/food
- B. Dietary habits of different ecological zones
- C. Cowpea texture - grittiness
- D. Color and size of seed not acceptable
- E. Flavor and texture are not acceptable
- F. Farmers aspire to occupations other than farming
- G. Importance of class in problems, resources, options and motivation-research should reflect reality of intended audience
- H. People "get tired" of eating cowpeas, lack of variety in methods of preparation

SOCIO-CULTURAL FACTORS

<u>Constraint</u>	<u>Problem</u>	<u>Geographic Area</u>	<u>Suggested Research Solutions</u>
IX	A. Multiplicity of farming systems in diversity of local conditions		
	B. Lack of intermediate technology and appropriate equipment		
	C. Seed industry not well developed		
	D. Roads, education, institutions are inadequate		
	E. Labor requirements are not met, migration influence		
	F. Sociology of small farm family as part of farming system not understood		
	G. Women's role in farming system, unique - needs not identified		
	H. No land zonification		
	I. Extension inadequate, production/consumption information lacking		
	J. Place of legumes in farming system		
	K. Understanding seasonality in demographic features: population density, land pressures, labor availability, resource drain		
	L. Institutional address of problems should include establishment of a bean center (and selected zones outside the center) for testing yield and local adaptation.		

FARMING SYSTEMS AND SERVICES

Constraint

Problem

Geographic Area

Suggested Research Solutions

X

- A. Stability or turnover of LDC and U.S. research personnel
- B. Language capability of U.S. scientists
- C. Trained LDC personnel insufficient in number
- D. Inefficient or lack of screening procedures
- E. Appropriate student training, motivate students
- F. Scientists needed: breeders, physiologists, entomologists, economists, nutritionists, food technologists, pathologists
- G. Technical support needed
- H. Laboratory supplies and equipment needed
- I. Continuing education of U.S. and LDC scientists
- J. Transportation capability to field/research sites
- K. Student strikes and some student distrust of U.S. field research
- L. Migration of scientists
- M. University research budget cuts
- N. Low level of education among populace

EDUCATION, TRAINING AND RESEARCH CAPABILITY

BEAN/COWPEA CRSP WORK DOCUMENT 2 (PRIORITIZATION)

Name _____ Representing Region _____

Please prioritize the overall constraint areas and the problems within each as you know them to exist in your region. Rank order each item, giving the number 1 to the most important. Do not repeat a number within the same column--you must resolve all "ties".

- | <u>Constraint Area</u> | <u>Rank</u> |
|--|-------------|
| I. Limitations of the Physical Environment | |
| II. Plant Pests and Diseases | |
| III. Plant Response Limitations | |
| IV. Farming Practices and Management | |
| V. Production/Consumption Economics | |
| VI. Storage and Commodity Maintenance | |
| VII. Nutrition, Food Preparation and Health | |
| VIII. Socio-cultural Factors | |
| IX. Farming Systems and Services | |
| X. Education, Training and Research Capability | |

101

Constraint I. Limitations of the
Phys. Environment

Constraint II. Plant Pests
& Diseases

<u>Problem</u>	<u>Rank</u>
A. Problems of chemical or physical properties of soil	
B. Deteriorating land quality (erosion, compaction, etc.)	
C. Water inadequate or excessive, especially during most critical time and temperature	
D. Temperatures too high or too low	
E. Nitrogen fixation & phosphorous use efficiency	
F. Wide variations in soils, climates, elevations, environmental resources within a given country	
G. Molybdenum requirements	
H. Altitude effects	
I. Sources of firewood for cooking rapidly being depleted	
J. Inadequate or non-existent irrigation facilities	

<u>Problem</u>	<u>Rank</u>
A. Insects in soils	
B. Insects in seedlings	
C. Insects in foliage	
D. Insects - stem boring	
E. Insects - pod boring	
F. Animals or birds destroy crops	
G. Fungal diseases	
H. Bacterial diseases	
I. Viral diseases	
J. Nematodes	
K. Weeds inadequately controlled	
L. Insects have become resistant to insecticides	
M. General pests and disease problems	
N. Development of integrated pest management strategies: Chemical, biological, cultural, social	
O. Disease resistant screening techniques needed	
P. Relationship of pest damage to plant stages and zonal influences	
Q. Factors affecting infection, multiplication and distribution of disease organisms	

102

Constraint III. Plant Response
Limitations

<u>Problem</u>	<u>Rank</u>
A. Low fertilizer response	
B. Yields strongly affected by wind and weather	
C. Low/non-nodulation at the farm level	
D. Other crops more productive	
E. Cultivars not adapted (daylength, temperature, etc.)	
F. Poor competitiveness in intercropping	
G. Inherent yield potential too low - especially in favored varieties	
H. Maturity, length of growth cycle	
I. Sensitivity to drought and/or cold	
J. Instability of performance	
K. Assemble and evaluate indigenous germ plasm collections - germ plasm exchange	
L. Physiological studies: plant efficiency, limitation of sinks, abscission, photo-respiration, etc.	
M. Poorly structured plant types characterized by: long vegetative phase preceding flowering and continuing through reproductive phase, large leaf area index, low ratio of seed to non-seed portions, self-shading, too viny and prostrate, plant architecture	
N. Nitrogen fixation problems including effects of high soil temperatures	
O. Sensitivity to lodging	
P. Water use efficiency	
Q. Plant nutrition & mineral efficiency	
In 232 bean fertilization trials in Brazil responses were noted in following frequencies: N - 67 times, P - 103, K - 15, lime - 31, micro-nutrients - 17	
R. Fertility trials and mineral toxicity	
S. Climatic zonal contribution to plant, rhizobial responses	

Constraint IV. Farming Practices & Management

<u>Problem</u>	<u>Rank</u>
A. Livestock waste used for other than fertilizer	
B. Low stand establishment	
C. Yield losses during growing season	
D. Harvest losses	
E. Seed quality (pathogens, saprophytes, physical)	
F. Farmers do not use modern measures to control diseases and pests	
G. Developed technologies are inappropriate	
H. Herbicide tolerance in mixed cropping systems	
I. Mixed cropping constraints and suitability	
J. Management (especially as it relates to small farms): tillage methods, rhizobial systems, timing, populations and spacial arrangements, utilization patterns	
K. Understanding of farmers' reasons lacking	
L. Fertilizer practices inadequate or indiscriminate relative to zone	
M. Indiscriminate use of insecticides	
N. Criteria for choice of varieties	
O. Land preparation untimely and inadequate	
P. Hand harvesting	
Q. Constraints of monoculture	

Constraint V. Production/Consumption
Economics

Constraint VI. Storage & Commodity
Maintenance

<u>Problem</u>	<u>Rank</u>
A. Economics of fertilizer availability -- use and response	
B. Land is not available	
C. Modern inputs are too costly	
D. Equipment not available or too costly	
E. Controlling insects is uneconomical	
F. Pesticides unavailable or can't afford them	
G. Risks are inherent in trying new technology	
H. New techniques not financially feasible	
I. Inadequate availability of credit and inadequate skill in use.	
J. Incentives lacking	
K. Farmers adapt modern technology to other crops but not to beans	
L. Farmers get only a small share of the retail market price	
M. Marketing	
N. Socio-political-economic systems limit the small farmer	
O. Small farmers have no political power - need cooperatives but not trusted	
P. Economics of nutrition	
Q. Assessment of governmental economic infrastructure: input supply, credit availability, extension support	
R. Risk aversion as small farmer motivator	
S. Large grower needs to include cultivars for mechanical harvesting and incentives.	
T. Inability to afford animal power	
U. Export markets within continent	
V. Economics of alternative production systems	
W. Other crops more profitable	
X. Economic analysis of various farming systems approaches	
Y. Impact of zone on costs of production	
Z. Economics of processing and commercialization both as seed and for human consumption	
AA. Determination of most suitable area for commercial production	
BB. Scarce and expansive energy resources	
CC. High labor costs	
DD. Economics of women's roles	

<u>Problem:</u>	<u>Rank</u>
A. Post-harvest losses	
B. Seeds become too hard when kept too long	
C. Maintenance of nutritive value in storage	
D. Appropriate "village" technology for storage responsive to unique conditions but frequently inadequate	
E. Diseased seed or pest infested	

104

Constraint VII. Nutrition, Food Preparation & Health

<u>Problem</u>	<u>Rank</u>
A. Home processing difficulties	
B. Beans cause problems as a food for young children	
C. Ease of cooking - takes too much fuel	
D. Low protein digestibility	
E. Low methionine or methionine availability	
F. Tannin content	
G. Gastro-intestinal or other disease limit human activity	
H. Grain nutritional quality & assessment on living organisms	
I. Antimetabolites & flatulence	
J. Heat treatment, toxicity & nutritive values	
K. Dietary habits inadequate - amino acid assessment	
L. Seed quality and size relative to yield and nutritive value	
M. Malnutrition & nutrition needs	
N. Scarce firewood for cooking	

Constraint VIII. Socio-cultural Factors

<u>Problem</u>	<u>Rank</u>
A. Beans are not a preferred crop/food	
B. Dietary habits of different ecological zones	
C. Cowpea texture - grittiness	
D. Color and size of seed not acceptable	
E. Flavor and texture are not acceptable	
F. Farmers aspire to occupations other than farming	
G. Importance of class in problems, resources, options and motivation-research should reflect reality of intended audience	
H. People "get tired" of eating cowpeas, lack of variety in methods of preparation	

105

Constraint IX. Farming Systems & Services

<u>Problem:</u>	<u>Rank</u>
A. Multiplicity of farming systems in diversity of local conditions	
B. Lack of intermediate technology and appropriate equipment	
C. Seed industry not well developed	
D. Roads, education, institutions are inadequate	
E. Labor requirements are not met, migration influence	
F. Sociology of small farm family as part of farming system not understood	
G. Women's role in farming system, unique - needs not identified	
H. No land zonification	
I. Extension inadequate, production/consumption information lacking	
J. Place of legumes in farming system	
K. Understanding seasonality in demographic features: population density, land pressures, labor availability, resource drain	
L. Institutional address of problems should include establishment of a bean center (and selected zones outside the center) for testing yield and local adaptation.	

Constraint X. Education, Training & Research Capability

<u>Problem:</u>	<u>Rank</u>
A. Stability or turnover of LDC and U.S. research personnel	
B. Language capability of U.S. scientists	
C. Trained LDC personnel insufficient in number	
D. Inefficient or lack of screening procedures	
E. Appropriate student training, motivate students	
F. Scientists needed: breeders, physiologists, entomologists, economists, nutritionists, food technologists, pathologists	
G. Technical support needed	
H. Laboratory supplies and equipment needed	
I. Continuing education of U.S. and LDC scientists	
J. Transportation capability to field/research sites	
K. Student strikes and some student distrust of U.S. field research	
L. Migration of scientists	
M. University research budget cuts	
N. Low level of education among populace	

106

BEAN/COWPEA CRSP WORK DOCUMENT 3 (COUNTRIES)

Name _____ Representing Region _____

The following countries have expressed an interest in early involvement in bean/cowpea research activity. Initially we anticipate research will be funded for the first round in a maximum of three countries per region. Based on your understanding of the bean/cowpea research needs, interests and capabilities in your region please recommend three countries from your own region which you feel would be the most appropriate for the initial work. Please indicate the appropriate commodity for each country (beans, cowpeas or beans/cowpeas). In each case give the reasons for your country choice.

East Africa

Kenya
Tanzania
Malawi
Zambia

West Africa

Nigeria
Cameroon
Niger
Upper Volta
Ghana

Caribbean

Jamaica
Trinidad
Guyana
Dominican Republic

Meso-America

Mexico
Guatemala
Costa Rica
Honduras

South America

Brazil
Colombia
Ecuador
Chile

Countries Recommended

Commodity

Reasons for Choice

1.

2.

3.

107

BEAN/COWPEA CRSP WORK DOCUMENT 4 (RESEARCH DESIGN)*

Name _____ Representing Region _____

Below are the countries you have recommended for initial bean/cowpea research activity in your region. Also indicated are the top constraint areas with their problems according to your recommendation. Assuming a maximum of three research programs in any one country, match the constraint problems to the country.*

Country & Commodity: _____

Constraint/Problems:

Country

Recommended Research Problems

_____	1. _____
	2. _____
	3. _____
_____	1. _____
	2. _____
	3. _____
_____	1. _____
	2. _____
	3. _____

*Where you think research problems should be combined in one interrelated research design, indicate by referencing all problems. For example, next to a given country you could indicate research on item IA should include VC and IXA. Thus under the Research column, for that country you would write IA-VC, IXA.

BEAN/COWPEA CRSP WORK DOCUMENT 6

Please review Planning Document D (Criteria for inclusion of U.S. Institutions in CRSP and consideration of 3 levels of funding) and your responses on Work Document 5. In the space below, give your response to Planning Document D and your ideas as to the U.S. institutions that should be involved in the overall CRSP plan.

110

A P P E N D I X E

EXAMPLES OF RETURNED COUNTRY RESEARCH RESPONSE SHEETS
and
CORRESPONDENCE
from
HOST COUNTRIES

4th February, 1980

Dr. Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program
Dept. of Crop and Soil Sciences
Michigan State University
East Lansing
MICHIGAN 48824

Dear Dr. Pat Barnes-McConnell,

Thank you for your letter of January 2, 1980 that I received on January 21, 1980. It is a pleasure to receive detailed write up on the short CRSP meeting we held at Michigan State University late last year.

I have looked through the report on Eastern African and in particular, Kenya, and the listing of the priorities are as the group discussed. I have further looked through the Evaluation sheet, and I find that, a number of research topics could be combined to be of first priority i.e. pre and post-harvest Crop Protection, as of being of great importance in the tropics.

I note that a meeting is scheduled in March in Malawi and we will send Drs. Mukunya, Gathuru and Muruli to represent the Faculty. I hope funds to support their participation will be forth coming. I hope to meet with your team when you visit Eastern Africa and discuss further the collaboration needed between this faculty and Michigan State University in this program.

Thank you for the nice reception we had at Michigan State University and I do apologise for delay in writing due to Christmas commitments and some other personal involvement in the U.N. agencies immediately I returned from Michigan State University.

Best regards to all.

Yours sincerely,



C.N. Karue
Dean

c.c. Dr. Adams.

112

From: *Kame*

LDC Collaborators Evaluation Sheet of Country Research Areas*

COUNTRY: KENYA (BEANS/COWPEAS)

TOPIC: The development of integrated crop protection strategies addressing pre- and post-harvest needs in a labor intensive, mixed cropping system with wide environmental variations.

<u>RESEARCH ITEMS</u>	<u>Rank</u>	<u>Name(s) of LDC Research Collaborator(s)</u>	<u>Type of U.S. Researchers Needed</u>
1. Development of practices and/or of genetic resistance to protect against stem borers in beans.	1	Dr. Mukunya	Pathologist
2. Incorporation of generalized and specific disease resistance into preferred seed types in dry beans.	1	Dr. Gathuru	Virologist
3. Coordinate with (not duplicate) the work of the Wageningen (Netherlands) team at Thika, working on virus resistance and germ plasm classification.	5		
4. Analysis of biological, varietal and physical factors of the environment affecting plant performance, particularly as reflected in flower and pod abscission.	2	Dr. Pathak	Breeder
5. Development of genetic resistance to environmental limitations (drought, temperature extremes, low fertility).	2	Dr. Muruli	Breeder
6. Analysis of traditional pest and disease control farming practices and their relationship to variations in the physical environment.	1	Dr. Mukunya	Pathologist
7. Work on the symbiotic interactions of plant responses in mixed cropping—plant, nutritional and protective aspects.	4		
8. Examination and analysis of present processing and storage methods.	3	Mrs. I. Gomez Mr. E. Karuri	Food Engineer Expert
9. Development of processing and storage methods and/or varieties that overcome the hardseed problem, and hence reduce cooking time and the need for fuel.	3	Food Science and Technology Dept.	"
10. Research on the insect problems of cowpeas, both in production and in storage.	1	Dr. Gathuru	Entomologist
11.			

Name of person completing this form _____ Discipline Agriculture Address P.O. Box 29053
Nairobi
Kabete

Name(s) of person(s) reviewing this form after completion: _____

*Make comments on reverse side.

Comments

Research
Item
No.

1. Research topics for 1 , 2, 6 and 10 should be combined as one integrated project on crop protection.

2.

3. Collaboration has continued at advisory level with Thika programme and is expected to continue.

4.

5.

6.

7. So far, the mixed crop specialist we had has gone and coordination on this is not possible now.

8.

9.

10.

11.

11

LDC Collaborators Evaluation Sheet of Country Research Areas*

COUNTRY: KENYA (BEANS/COWPEAS)

TOPIC: The development of integrated crop protection strategies addressing pre- and post-harvest needs in a labor intensive, mixed cropping system with wide environmental variations.

<u>RESEARCH ITEMS</u>	<u>Rank</u>	<u>Name(s) of LDC Research Collaborator(s)</u>	<u>Type of U.S. Researchers Needed</u>
1. Development of practices and/or of genetic resistance to protect against stem borers in beans.	9	DR. B.I. MURULI	PLANT BREEDER
2. Incorporation of generalized and specific disease resistance into preferred seed types in dry beans.	4	DR. S.O. KEYA	SOIL SCIENTIST
3. Coordinate with (not duplicate) the work of the Wageningen (Netherlands) team at Thika, working on virus resistance and germ plasma classification.	10	DR. D. M. MUKUNYA	ENTOMOLOGIST/ NEMATOLOGIST
4. Analysis of biological, varietal and physical factors of the environment affecting plant performance, particularly as reflected in flower and pod abscission.	1		PHYSIOLOGIST
5. Development of genetic resistance to environmental limitations (drought, temperature extremes, low fertility).	6		
6. Analysis of traditional pest and disease control farming practices and their relationship to variations in the physical environment.	2		
7. Work on the symbiotic interactions of plant responses in mixed cropping-- plant, nutritional and protective aspects.	5		
8. Examination and analysis of present processing and storage methods.	8		
9. Development of processing and storage methods and/or varieties that overcome the hardseed problem, and hence reduce cooking time and the need for fuel.	7		
10. Research on the insect problems of cowpeas, both in production and in storage.	3		
11.			

Name of person completing this form Bartholomew I. Muruli Discipline Crop/Physiologist/ Nutritionist Address Crop Science University of Nairobi P. O. Box 30197, Nairobi Kenya.

Name(s) of person(s) reviewing this form after completion: Dr. S. O. Keya, Chairman, Department of Soil Science, University of Nairobi,

*Like comments on reverse side. Bcx 30197, NAIROBI, Kenya.

Comments

Research
Item
No.

1. Adaptation of cultivars to the environment, high yielding types. Little is known about these factors, especially in relation to leaf picking and seed yield.
2. Pests and diseases are the major problems in cowpeas.
3. Same as for (2) above.
4. Varieties resistant to pests ought to be tailored for various ecological zones.
5. Cowpeas easily find their rhizobia in the soil. However it is vital that cowpeas should fix adequate nitrogen at least for themselves.
6. Low fertility, drought, temp moisture stress, are major limiting factors to production.
7. Traditional storage methods are lagging behind current production and technology trials.
8. Same as (7) above
9. Stem borer is not of high priority in cowpeas.
10. Adequate competence exist at the University of Nairobi. At a joint meeting with the Ministry of Agriculture, at least for Kenya, it had been agreed that Thika people better concentrate on beans and the University of Nairobi concentrates on cowpeas and pigeon peas.
- 11.

UNIVERSITY OF DAR ES SALAAM

FACULTY OF AGRICULTURE AND FORESTRY
P. O. Box 643 — MOROGORO — TANZANIA

Telephone No. 2312

Telegrams: "UNIAGRIC"
MOROGORO

Our Ref.:

Your Ref.: CS/R/58



8th February, 1980.

Dr. Pat Barnes-McConnell,
Assistant Coordinator,
Bean/Cowpea Planning Programme,
Michigan State University,
Department of Crop and Soil Sciences,
Soil Science Building,
East Lansing,
MICHIGAN,
U.S.A.

Dear Dr. Barnes-McConnell,

It was indeed very kind of you to write about the proposed Bean Programme. We have discussed it at the Departmental level and we will be very pleased to participate in the programme. I gathered from Dr. Paul Duffield that you will be going to the Malawi Bean Workshop. I will be going there as well - we are presenting a Country Report at the Workshop.

Enclosed please find the form duly completed. I am looking forward to meeting you again.

Yours sincerely,

A handwritten signature in cursive script, reading "Bruno J. Ndunguru".

Bruno J. Ndunguru
Head, Crop Science Department

5m1.1

117

LDC Collaborators Evaluation Sheet of Country Research Areas*

COUNTRY: TANZANIA (BEANS)

TOPIC: Zone related germ plasma evaluations with attention to adaptability, pests, and disease resistance, plant performance in intercropped patterns and consumer acceptance characteristics (size, color, taste, cooking time, toxicity and nutritional value).

RESEARCH ITEMS	Rank	Name(s) of LDC Research Collaborator (s)	Type of U.S. Researchers Needed
1. Evaluation based on land races collected from different ecological zones in the country.	1	MBUNGURU BOTO TERI KAREL	
2. Assessment of pest and disease resistance to isolate lines for a breeding program.	3	DR BOTO DR. KAREL DR. TERI	BREEDER / PATHOLOGIST
3. Assessment of drought resistance and other performance characteristics, including yield and cooking quality, particularly in those land races more highly favored by subsistence farmers.	2	DR. BOTO DR. MBUNGURU	DROUGHT RESISTANCE
4. Analysis of consumer preference for size, color, taste and the traditions associated with identified varieties (e.g., varieties eaten by pregnant women, those used for weaning food, etc.)	4	MAMUZI MBUNGURU	
5. Evaluation of nutritional quality, toxicity and other health factors in identified varieties, including gastrointestinal complaints in adults and children.	5	BANGU N.	CHILD HEALTH NUTRITION
6. Evaluation of traditional processing methods of identified varieties for energy use, resultant nutritional quality and toxicity.	6	MTEBE K.	FOOD TECHNOLOGIST
7. Survey of all traditional uses of all parts of the favored varieties (stems, leaves, etc.) and their contribution to the survival of the farm family.	7	MAMUZI MBUNGURU	
8.			

Name of person completing this form: DR. BRUNO J. MBUNGURU Discipline: CROP PHYSIOLOGIST Address: UNIVERSITY OF DAR ES SALAAM
DEPT OF CROP SCIENCE
P.O. Box 643
 Name(s) of person(s) reviewing this form after completion: DRS BOTO, KAREL, TERI and
MR. MAMUZI
MR. RUGGOLD
TANZANIA

*Make comments on reverse side. NONE ON REVERSE SIDE.

101

LDC Collaborators Evaluation Sheet of Country Research*

COUNTRY: MAJAWI (BEANS)

TOPIC: The contribution of culture, the physical environment, agronomic practices and plant genetics in the evolution and maintenance of naturalized bean land-races.

<u>Research Items</u>	<u>Rank</u>	<u>Name(s) of LDC research Collaborator(s)</u>	<u>Type of U.S. Researchers Needed</u>
1. Determine the basis and the utility of typical land race diversity in the region.	6	C. T. Edje	
2. Identify the biological, physical and cultural forces accounting for the present patterns of diversity.	2	and	
3. Establish the plant and cultural characteristics essential to acceptance by subsistence farmers.	1	D. Greenberg	
4. Determine the role of women in production of beans, seed selection, and group acceptance of particular types for specific uses.	3	and	
5. Determine the desire for and the definition of "improved" cultivars in a complex social system characterized by many different bean identified village groups.	4	Dr. Rao	
6. Derive principles to serve as guidelines to the successful introduction of an improved cultivar.	5		
7.			

Name of person completing this form C. T. Edje Discipline Agronomist Address Bunkla College

Name(s) of person(s) reviewing this form after completion: _____

*Make comments on reverse side.

A P P E N D I X F

SUMMARY OF CONSTRAINT PRIORITIES
and
PRIORITY RANKINGS WITHIN CONSTRAINT AREAS

12

SUMMARY OF CONSTRAINT AREA PRIORITIZATION

Table 1.

Constraint Areas	G. da Silva-Dias	Brasil - South America (B/C)	Peter Goldsworthy	(C)	T. Ferguson	(B/C)	Caribbean Zone	(B/C)	C. N. Karue	(B/C)	Kenya - East Africa	(B/C)	E. Mmbaga	Tanzania - East Africa (B)	A. M. Pinchinat, IICA (B)	Meso-America	P. Graham	(B)	C.I.A.T. - Global	(B)	C. Wien	(C)	West Africa	(C)	Average of 8	D. H. Wallace - Plan. Off.	M. W. Adams - Plan. Off.	P. W. Barnes-McConnell - Plan. Off.	J. Yohe	AID - Washington
	Limitations of Physical Environment	3	4	4	9	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.5	3	5	8	10	
Plant Pests & Diseases	1	1	2	1*	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.4	2	1	4	1		
Plant Response Limitations	4	2	1	2	3	3	2	8	3.1	4	2	3	2	2	3	3	2	8	3.1	4	2	3	2	3.1	4	2	3	2		
Farming Practices and Management	6	5	3	7	9	1	5	5	5.1	10	4	1	4	4	1	4	4	5.1	10	4	1	4	4	5.1	10	4	1	4		
Production/Consumption Economics	7	6	6	4	7	6	7	7	6.2	9	6	2	7	6.2	9	6	2	7	6.2	9	6	2	7	6.2	9	6	2	7		
Storage and Commodity Maintenance	2	8	7	3	6	5	6	3	5.1	7	7	7	5	5.1	7	7	7	5.1	7	7	7	7	5	5.1	7	7	7	5		
Nutrition, Food Preparation and Health	9	9	8	6	8	7	3	10	8.1	8	9	5	3	8.1	8	9	5	3	8.1	8	9	5	3	8.1	8	9	5	3		
Socio-cultural Factors	10	10	10	8	5	8	10	9	8.8	6	8	6	8	8.8	6	8	6	8	8.8	6	8	6	8	8.8	6	8	6	8		
Farming Systems & Services	8	7	9	5	10	9	9	6	7.9	5	10	9	6	7.9	5	10	9	6	7.9	5	10	9	6	7.9	5	10	9	6		
Education, Training & Research Capability	5	3	5	1*	1	10	3	2	3.8	1	3	10	9**	3.8	1	3	10	9**	3.8	1	3	10	9**	3.8	1	3	10	9**		

*Dean Karue, overlooking the fact that we had agreed before scoring the constraint area that education and training should be a part of all projects, wished to emphasize that two areas should receive highest priority.

**Dr. Yohe provided two sets of scores; the scores listed here reflect his understanding that education and training would be integrated into all projects, and therefore did not really need a high score.

PRIORITIES WITHIN SELECTED CONSTRAINT AREAS

Plant Pests & Diseases

	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell J. Yohe AID - Washington
	B C								B C		
A. Insects in soils	7 9	16	9	15	11	7	12		11 13	12	
B. Insects in seedlings	8 10	15	8	14	1	9	3	5	8 9	13	
C. Insects in foliage	3 2	3	6	13	17	4	4	7	4 4	14	
D. Insects - stem boring	9 7	1	7	11	16	-	9	6	9 11	6	
E. Insects - pod boring	10 8	2	2	12	4	5	8	1	10 12	7	
F. Animals or birds destroy crops	14 14			16	15	-	13	13		17	
G. Fungal diseases	4 5	6	3	1	2	3	1	7	1 6	8	
H. Bacterial diseases	2 3	7	5	3	5	2	4	8	2 5	9	
I. Viral diseases	1 1	5	4	4	3	1	2	2	3 7	10	
J. Nematodes	5 4	14	11	2	12	8	7	10	4 7	10 15	
K. Weeds inadequately controlled	11 11	13	10	10	8	10	11	3	3 5	8 11	
L. Insects have become resistant to insecticides	12 12	12	16	17	14	-	15	14		16	
M. General pest & disease problems	13 13	11	1	5	6	11		15	6 3	1 9	
N. Development of integrated pest management strategies: Chemical, biological, cultural, social		10	12	6	7	6	5	4		1 2	
O. Disease resistant screening techniques needed	6 6	8	13	7	9	13	10	9		14 5	
P. Relationship of pest damage to plant stages & zonal influences	8 8	4	14	8	13	12	14	12		15 3	
Q. Factors affecting infection, multiplication and distribution of disease organisms	7 7	9	15	9	10	14	6	11		2 4	

122

Discussion and Interpretation

It is clear that the region represented by the individual scorer and whether the individual scorer had a primary concern for beans or cowpeas play predominant roles in his assigning priorities to the various problems listed.

From that perspective, it may be concluded that insects in cowpeas, and diseases in beans constitute major problems in these two crops, respectively. Moreover, it appears that diseases in cowpeas and insects in beans would rank as second priorities in each crop. Nematodes and weeds follow as of third priority.

The last four items listed, commencing with need for integrated pest management, are more in the nature of solutions than of problems, and the rankings given these subjects reflect the primary concerns with insects and diseases.

Clearly, then, in the final CRSP, support should be given to research proposals designed to alleviate these fundamental pest-disease problems in both crops. Consideration in selecting and assigning proposals will have to be given to area and to the possible impact of a new CRSP on Crop Protection currently in the planning stage.

125

Plant Response Limitations

	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell J. Yohe AID - Washington	
A. Low fertilizer response	4	15	9	5	2	-	13	18	5	10	17	5
B. Yields strongly affected by wind and weather	15	18	7	17	19	-	11	8	2	15	19	10
C. Low/non-nodulation on farms	7	17	11	4	8	-	4	17		7	18	4
D. Other crops more productive	6	16	14	13	13	-	12	9		14	16	
E. Cultivars not adapted (daylength, temperature, etc.)	10	6	4	14	12	9	2,1	3		8	15	1
F. Poor competitiveness in intercropping	5	12	18	11	7	-	9	16		16	1	3
G. Inherent yield potential too low - especially in favored varieties	2	8	1	12	1	8	1,2	2		1	4	2
H. Maturity, lengths of growth cycle	9	9	19	7	18	11	7	10		13	11	8
I. Sensitivity to drought and/or cold	3	10	6	8	6	10	5	11	3	6	12	7
J. Instability of performance	6	4	5	16	9	5	8	19		12	3	1
K. Assemble and evaluate indigenous germ plasm collections - germ plasm exchange	-	1	3	9	16	6	10	15	1	4	2	-
L. Physiological studies: plant efficiency, limitation of sinks, abscission, photo-respiration, etc.	-	11	2	10	15	1	2	6	1-4	3	10	6
M. Poorly structured plant types such as: long vegetative phase preceding flowering & continuing through reproductive phase, large leaf area index, low ratio of seed to non-seed portions, self-shading, too viny & prostrate, plant architecture	1	2	17	18	14	2	1	4		2	9	9
N. Nitrogen fixation problems including effects of high soil temperatures	8	3	10	1	10	13	4	7	4	5	6	4
O. Sensitivity to lodging	14	19	16		5	12	6	13	1	11	13	-
P. Water use efficiency	13	5	15	2	4	7	-	12	3	9	14	-
Q. Plant nutrition & mineral use efficiency	11	13	8	3	17	3	3	1	5	17	7	5
R. Fertility trials & mineral toxicity	-	14	12	6	11	4	3	5	5	18	8	5
S. Climatic zonal contribution to plant, rhizobial responses	12	7	13	15	3	-	14	14	5	19	5	-

124

Discussion and Interpretation

This constraint category refers to inherent limitations in the plants' ability to deal with environmental and biological stresses, and to produce high yields of grain under a diversity of conditions between and within countries and farming systems.

The responses of the panel, as might be expected, given individual backgrounds and the sometimes overlapping nature of the problems, appear quite variable.

Most panelists scored "inherent yield potential too low" as of high priority. Poorly structured plant types, and physiological impairments including sensitivity to drought or temperature, inefficient utilization of nutrients, water, and inadequate nitrogen fixation relationships appear to be seen by the panelists as probable causes of low yield potential. These factors would lead to instability of performance or poor adaptation, which some panelists saw as of high priority. Among possible solutions, most of which were not expressly listed in this category, was one which was listed as "assemble and evaluate indigenous germ plasm"; this item was scored intermediate to high, and is one which would follow naturally in any campaign against "low yield potential".

Items such as "yields strongly affected by wind and weather", "climatic zonal contribution to plant, rhizobial responses", and "other crops more productive", quoted more or less verbatim from the cited Documentation, were apparently perceived as too general, or perhaps too redundant as compared with certain other items more specifically stated, to be ranked very high.

Limitations of the Physical Environment

	G. da Silva-Dias	Brasil - South America	Peter Goldsworthy	I.I.T.A. - Global	T. Ferguson	Caribbean Zone	C. N. Karue	Kenya - East Africa	E. Mmbaga	Tanzania - East Africa	A. M. Pinchinat	Meso-America	P. Graham	C.I.A.T. - Global	C. Wien	West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe	AID - Washington
A. Problems of chemical or physical properties of soil	4	4	4	4	5	3	1	1	2	4	4	3	4								
B. Deteriorating land quality (erosion, compaction, etc.)	5	5	5	3	5	2	4	1	3	9	2	5									
C. Water inadequate or excessive, especially during most critical time and temperature	2	1	3	2	1	4	3	3	1	2	1	3									
D. Temperatures too high or too low	6	6	2	10	7	-	6	5	2	5	6	6									
E. Nitrogen fixation & phosphorous use efficiency	1	2	6	1	6	5	2	4	3	1	5	2									
F. Wide variations in soils, climates, elevations, environmental resources within a given country	3	3	1	6	4	3	7	8	7	3	4	1									
G. Molybdenum requirements	9	10	10	9	8	7	5	9	6	10	9	7									
H. Altitude effects	10	7	8	7	9	-	8	10		8	8	8									
I. Sources of firewood for cooking rapidly being depleted	8	8	9	8	10	8	9	7	5	6	7	9									
J. Inadequate or non-existent irrigation facilities	7	9	7	4	2	6	10	6	8	7	10	10									

126

Discussion and Interpretation

It was recognized, in this constraint area, as in several of the others, that some of the items listed as problems simply are not researchable items. For example, firewood resources are becoming scarce, but it isn't the function of this CRSP to develop alternate fuels for cooking. It conceivably could become a CRSP function to develop processes that tend to be fuel efficient, or cultivars that required less cooking time. Similarly, from a direct research standpoint little can be done to change "altitude", but the effects of low temperatures might be mitigated in some way. We must, in interpreting panelist responses in these areas, be aware that a particular problem is not necessarily a less severe constraint just because it is perceived as not researchable and given a low priority (high number) accordingly.

On balance, it appears that the problems of inadequate or excessive amounts of water, and of nitrogen-fixation and phosphorous-use efficiency by beans or cowpeas are judged by the panelists to be most severe. "Chemical and physical properties of soils" and "wide variations in soils and climates" each received moderately high priority. These items are, however, quite general, and both can be regarded as more general cases of the specific problems exemplified by the items of water, nitrogen fixation, and phosphorous use efficiency, all of which scored higher in priority.

Deteriorating quality of land is clearly of concern, not the highest nor yet the lowest in ranking among the ten items listed. As a subject for research support, this problem lies perhaps more in the area of farming practices or management.

It may be concluded that research support in this constraint area should be directed toward the plant-soil interface and in crop, water, and soil management.

12/21

	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
Farming Practices & Management												
A. Livestock waste used for other than fertilizer	16	14	17	16	12	-	14	17		17	10	15
B. Low stand establishment	4	13	4	15	1	8	4	14		16	12	2
C. Yield losses during growing season	3	6	1	4	16	-	100	1		2	13	1
D. Harvest losses	2	7	2	3	15	10	5	3		11	14	4
E. Seed quality (pathogens, saprophytes, physical)	1	12	3	-	7	5	3	4	2	10	4	3
F. Farmers do not use modern measures to control diseases and pests	7	2	10	6	2	-	10	5		3	16	14
G. Developed technologies are inappropriate	13	8	6	5	8	2	9	11	3	8	5	7
H. Herbicide tolerance in mixed cropping systems	12	17	12	7	11	4	13	6		9	7	8
I. Mixed cropping constraints and suitability	9	3	13	1	3	3	2	10		13	2	5
J. Management (especially as it relates to small farms): tillage methods, rhizobial systems, timing, populations and spacial arrangements, utilization patterns	6	1	5	2	4	1	1	2		1	3	6
K. Understanding of farmers' reasons lacking		4	9	14	10	9	6	7	1	12	1	11
L. Fertilizer practices inadequate or indiscriminate relative to zone	8	11	8	8	9	6	8	12		4	8	10
M. Indiscriminate use of insecticides	15	16	11	13	5	-	11	15		6	9	13
N. Criteria for choice of varieties	10	5	7	9	6	-	7	8		7	6	12
O. Land preparation untimely and inadequate	11	9	14	12	13	7	(J)	9		5	11	9
P. Hand harvesting	5	15	15	10	14	-	12	13		15	15	16
Q. Constraints of monoculture	14	10	16	11	-	-		16		14	17	7

Discussion and Interpretation

The inclusive generality of certain items and the very singular specific nature of other items in this list led to much heterogeneity in patterns of response by different panelists.

The problem of management seemed to most panel members as major, in this constraint area. But we could include in this problem the item listed as "farmers don't use modern methods of insect and disease control" which elicited high priority from some panel members. "Yield losses during the growing season" could mean several things: insect damage; disease damage; infertility; drought effects; blossom and pod abscission; lodging; etc. Nevertheless, as a general category of more specific problems, this item drew relatively high priority. Seed quality was a third item of a somewhat more specific nature than the first two, which drew moderately high priority scores.

Harvest losses and constraints caused by mixed cropping followed as being of intermediate concern. These also are somewhat more specific than the category "management", but may be seen as special aspects of management. None of the other problems in this constraint category were deemed very severe.

It seems prudent, then, to conclude that, in this category, aspects of crop management, and factors affecting yield losses during the growing season should receive research support, to the extent that the category itself has priority. It should be noted that among factors affecting yield losses during the growing season are such things as, for example, insects and diseases, which have already been designated as of top priority.

129

Storage & Commodity Maintenance

- A. Post-harvest losses
- B. Seeds become too hard when kept too long
- C. Maintenance of nutritive value in storage
- D. Appropriate "village" technology for storage responsive to unique conditions but frequently inadequate
- E. Diseased seed or pest infested

	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Post-harvest losses	5	1	1	1	1	1	1	2	1	3	4	3
B. Seeds become too hard when kept too long	2	4	3	4	5	2	2	4	2	1	1	2
C. Maintenance of nutritive value in storage	3	5	4	3	4	4	4	5	-	4	2	5
D. Appropriate "village" technology for storage responsive to unique conditions but frequently inadequate	4	3	5	2	3	5	5	3	3	5	5	4
E. Diseased seed or pest infested	1	2	2	5	2	3	3	1	(1)	2	3	1

Discussion and Interpretation

Post-harvest losses clearly commands top priority in this constraint area, and diseased or pest infested seed, the most important aspect of post harvest losses, is of second priority. Hard seededness in stored seeds is recognized as a major problem only by those panelists representing regions where beans are the major grain legume.

130

Production-Consumption Economics

	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Economics of fertilizer availability--use & response	15	4	18	6	24	9	1	6		15	6	10
B. Land is not available	16	26	19	5	29	-	23	20		28	30	-
C. Modern inputs are too costly	12	8	8	7	1	-	6	11		14	2	11
D. Equipment not available or too costly	11	9	9	8	2	-	(6)	7		22	19	12
E. Controlling insects is uneconomical	9	2	15	9	30	-	8	8		16	29	13
F. Pesticides unavailable or can't afford them.	10	1	16	11	3	-	(6)	9		3	20	14
G. Risks are inherent in trying new technology	1	15	10	12	28	-	22	10		2	7	4
H. New techniques not financially feasible	5	16	4	20	7	-	21	5		1	25	6
I. Inadequate availability of credit and inadequate skill in use.	6	10	25	2	25	10	2	2		4	3	5
J. Incentives lacking	29	17	24	3	24	11	20	24		17	1	4
K. Farmers adapt modern technology to other crops but not to beans.	13	25	27	28	4	12	19	23		5	17	15
L. Farmers get only a small share of the retail market price.	3	11	26	13	20	-	18	12		6	18	22
M. Marketing	4	14	5	1	11	5	3	13		23	27	3
N. Socio-political-economic systems limit the small farmer.	2	12	7	14	12	6	15	4	3	7	13	7
O. Small farmers have no political power - need cooperatives but not trusted	7	13	23	25	21	-	17	3		8	21	21
P. Economics of nutrition	28	24	22	1	26	-	16	25		24	4	20
Q. Assessment of governmental economic infrastructure: input supply, credit availability, extension support	19	7	-	24	13	3	4	1		30	8	8
R. Risk aversion as small farmer motivator	17	3	21	23	22	13	5	21	2	27	16	9
S. Large grower needs to include cultivars for mechanical harvesting & incentives.	18	28	6	27	23	4	19	29		25	24	19
T. Inability to afford animal power	8		29	26	19	-	9	14		29	9	12
U. Export markets within continent	27	18	28	16	18	-	15	30		20	28	-
V. Economics of alternative production systems.	26	19	1	15	17	1	14	15	4	21	12	1
W. Other crops more profitable.	14	20	2	17	5	-	12	17		9	15	18
X. Economic analysis of various farming systems approaches	25	5	14	18	15	2	7	16	1	10	11	2
Y. Impact of zone on costs of production	24	21	20	19	10	-	24	26		26	14	13
Z. Economics of processing & commerciali- both as seed & for human consumption	20	22	3	10	9	7	11	28		18	26	14
AA. Determination of most suitable area for commercial production	23	6	11	21	8	-	26	22		19	23	15
BB. Scarce & expensive energy resources	21	23	12	22	6	8	25	18		11	10	10
CC. High labor costs	22	27	13	4	14	-	10	19		12	22	16
DD. Economics of women's roles	-	29	17	29	16	14	13	27		13	5	17

Discussion and Interpretation

With a total of 30 problems listed in this constraint category, and given the lack, in the panel, of strength in the field of economics, we should not have expected a clear consensus on the gravity of particular problems. A consensus has emerged, however, as regards certain issues; these are the issues of costs and risks, the issue of marketing and return, and the issue of economic analysis of alternative farming systems.

These issues boil down to a major concern about investing money in a technology that may or may not pay off, the risks involved, the benefits that might accrue from other technologies or systems, and whether or not a particular technology or system will be accepted, will pay its costs; this hinges upon the marketing process and how much of the retail selling price the farmer receives.

For the technological side of the CRSP, the implication is that new technologies must not be expensive, they must require a minimum of prior investment of money, they must carry a high probability of favorable results if adopted, and, if possible, they must have a positive impact upon the marketing process. An example might be a simple inexpensive technological change that made it possible to overcome the hard seed problem in stored beans; or an inexpensive means of protecting cowpea seeds from ravages of stored insect pests.

132

Farming Systems and Services

	G. da Silva-Dias	Brasil - South America	Peter Goldsworthy	I.I.T.A. - Global	T. Ferguson	Caribbean Zone	C. N. Karue	Kenya - East Africa	E. Mmbaga	Tanzania - East Africa	A. M. Pinchinat	Meso-America	P. Graham	C.I.A.T. - Global	C. Wien	West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe	AID - Washington
A. Multiplicity of farming systems in diversity of local conditions	1	2	1	1	9	2	2	3	2	11	1	2									
B. Lack of intermediate technology and appropriate equipment	2	1	3	9	8	1	5	4	3	1	5	3									
C. Seed industry not well developed	4	5	2	8	7	-	6	5	4	4	12	6									
D. Roads, education, institutions are inadequate	3	7	4	10	6	-	8	2	-	10	10	7									
E. Labor requirements are not met, migration influence	11	8	9	7	11	-	7	7	-	7	8	11									
F. Sociology of small farm family as part of farming system not understood	5	3	5	6	5	3	3	6	1	5	2	4									
G. Women's role in farming system, unique needs not identified	6	11	10	11	10	4	9	11	5	3	3	8									
H. No land zonification	8	10	6	12	12	-	10	12	-	12	9	12									
I. Extension inadequate, production/consumption information lacking	7	4	8	5	2	5	4	1	-	2	6	9									
J. Place of legumes in farming system	10	9	7	2	3	-	1	10	-	8	7	5									
K. Understanding seasonality in demographic features: population density, land pressures, labor availability, resource drain	9	6	11	3	4	-	11	8	-	9	4	10									
L. Institutional address of problems should include establishment of a bean center (and selected zones outside the center) for testing yield and local adaptation.	-	12	12	4	1	-	12	9	-	6	11	1									

133

Discussion and Interpretation

Most panelists saw the "multiplicity of farming systems within a diversity of local conditions" as a serious constraint. This was followed by a general "lack of intermediate technology and appropriate equipment". Development of some organized seed industry fell in an intermediate level of priority, as did the recognition that too little is known of the socio-cultural aspects associated with the small family farmer. The inadequacy of extension was recognized as of fifth highest priority, and supports, though not strongly, the oft-repeated reports of the Bean/Cowpea CRSP Travel Teams on this matter.

None of the other problems in this category rated serious concern by the panel.

It should also be noted that as a general constraint category this one was not rated of high priority. However, it must be acknowledged that some of the panelists felt that the titles of this category (Farming Systems and Services) and of "Farming Practices and Management" were so similar as to imply that the listed problems belonged in a single category. A re-evaluation of the two sets of problems indicates to me (M.W.A.) that, while the titles may appear to overlap, the problem arrays are quite distinct.

12/11

Nutrition, Food Preparation & Health

	G. da Silva-Dias	Brasil - South America	Peter Goldsworthy	I.I.T.A. - Global	T. Ferguson	Caribbean Zone	C. N. Karue	Kenya - East Africa	E. Mmbaga	Tanzania - East Africa	A. M. Pinchinat	Meso-America	P. Graham	C.I.A.T. - Global	C. Wien	West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe	AID - Washington
A. Home processing difficulties	1	3	9	1	11	-	3	3	8	6	6										
B. Beans cause problems as a food for young children	6	12	11	10	5	-	9	9	4	2	5										
C. East of cooking - takes too much fuel	2	2	1	11	4	2	2	2	1	3	9						1	1	3	9	
D. Low protein digestibility	7	6	7	9	1	3	1	10	2	12	1							2	12	1	
E. Low methionine or methionine availability	8	5	2	3	2	4	7	4	3	11	4							3	11	4	
F. Tannin content	9	-	8	12	3	1	8	5	7	14	2							7	14	2	
G. Gastro-intestinal or other diseases limit human activity	10		13	13	12	-	10	6	2	10	-							11	10	-	
H. Grain nutritional quality & assessment on living organisms	11	4	3	2	9	5	11	8	10	8	3							10	8	3	
I. Antimetabolites & flatulence	12	7	4	6	13	6	12	11	12	5	4							12	5	4	
J. Heat treatment, toxicity & nutritive values	13	8	12	5	14	7	6	12	9	4	4							9	4	4	
K. Dietary habits inadequate - amino acid assessment	14	9	14	8	10	-	5	7	5	7	7							5	7	7	
L. Seed quality and size relative to yield and nutritive value	3	1	5	7	7	-	13	13	6	9	10							6	9	10	
M. Malnutrition & nutrition needs	5	10	6	4	6	-	4	1	13	1	8							3	13	1	8
N. Scarce firewood for cooking	4	11	10	14	8	-	(3)		4		11							4	13	11	

Discussion and Interpretation

Two principal problems were identified in this category. One has to do with the length of cooking time required and the consequent amount of fuel consumed. This, of course, can be correlated with one of the problems cited in the storage category--that of hard seed development, particularly in beans. These comprise particular aspects of the more vaguely stated problem of "home processing difficulties" which also ranked relatively high in priority.

The other problem area has long been acknowledged--that of sulfur amino-acid deficiency and low protein digestibility.

Overall, this constraint category was not perceived as highly important. The two problem areas noted, however, are important, and if possible should be supported in the CRSP.

Socio-cultural Factors

- A. Beans are not a preferred crop/food
- B. Dietary habits of different ecological zones
- C. Cowpea texture - grittiness
- D. Color and size of seed not acceptable
- E. Flavor and texture are not acceptable
- F. Farmers aspire to occupations other than farming
- G. Importance of class in problems, resources, options and motivation-- research should reflect reality of intended audience
- H. People "get tired" of eating cowpeas, lack of variety in methods of preparation.

	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A.	6	5	6	5	8	-	5	8		5	8	5
B.	1	4	3	4	4	-	6	4		4	7	3
C.	4	3	5	1	1	2	4	5		6	5	6
D.	2	1	2	2	(B) 3	-	1	1		3	4	2
E.	3	2	4	3	(C) 2	1	2	2		2	3	1
F.	8	8	1	6	7	-	8	3		8	2	8
G.	7	6	8	7	6	-	3	6		1	1	7
H.	5	7	7	8	5	3	7	7		7	6	4

Discussion and Interpretation

The priority assessments of problems in this constraint category were fairly clear across all panelists. Problems of flavor, texture, color and size of seed appeared to be of greatest concern. This is to be judged in a relative context--relative, that is, to the other problems in the category with which these are being evaluated by each panelist. And the items listed did not represent a full scope of problems that could have come in under the rubric of socio-cultural factors.

The two aspects of concern were (1) preferences regarding flavor, texture, color and size have to be determined, and (2) the results have to be incorporated in the breeding objectives of certain programs, and/or in the research design of any home processing research undertaken. In this regard, the overwhelming preponderance of production oriented persons on the panel explains the obvious assumption of the group that for the most part the problem of famine is a problem of production. While this assumption supports one among many legitimate biases, it is nonetheless a bias which clearly exerts a strong influence on these data. As previously stated, the panelists suggested that, like education and training, the socio-cultural dimension should be addressed as part of all research wherever possible. Concern was expressed, however, that such efforts should be directly relevant to the implications for bean/cowpea production and/or consumption.

Education, Training
and Research Capability

- A. Stability or turnover of LDC and U.S. research personnel
- B. Language capability of U.S. scientists
- C. Trained LDC personnel insufficient in number
- D. Inefficient or lack of screening procedures
- E. Appropriate student training, motivate students
- F. Scientists needed: breeders, physiologists, entomologists, economists, nutritionists, food technologists, pathologists
- G. Technical support needed
- H. Laboratory supplies and equipment needed
- I. Continuing education of U.S. and LDC scientists
- J. Transportation capability to field/research sites
- L. Migration of scientists
- M. University research budget cuts
- N. Low level of education among populace

	G. da Silva-Dias	Brasil - South America	Peter Goldsworthy	I.I.T.A. - Global	T. Ferguson	Caribbean Zone	C. N. Karue	Kenya - East Africa	E. Mmbaga	Tanzania - East Africa	A. M. Pinchinat	Meso-America	P. Graham	C.I.A.T. - Global	C. Wien	West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe	AID - Washington
A.	9	8	5	2	12								4	7	6	5	5	5	2		
B.	10	12	14	12	8								13	8	7	12	8	7			
C.	1	1	2	1	9								(1)	1	1	6	1	1			
D.	11	7	13	-	10								7	14		14	14	14	8		
E.	6	2	4	4	2								3	2		7	2	6			
F.	3	3	3	3	4								1	3	1	1	7	1			
G.	12	4	6	5	5								2	4	2	2	10	3			
H.	4	6	7	6	6								5	6	3	3	6	5			
I.	8	-	10	7	11								8	9	4	4	9	6			
J.	12	5	9	8	3								9	12	5	8	3	4			
L.	5	11	1	9	13								6	10		9	12	(2)			
M.	7	9	8	10	7								11	11		10	11	9			
N.	2	10	11	11	1								12	5		11	4	10			

all of high priority,
but not of a
research nature, per se.

135

Discussion

It had been generally agreed in the LDC Advisory Group, as prioritizing commenced, that this category was of high priority, and that educational and training components should be incorporated into nearly every research project undertaken in the CRSP. This should mean more than the mere acceptance of LDC students into an academic training program. It should imply their involvement in the research being conducted, at the design stage if possible, but certainly in the research functions of data collection, analysis, and interpretation. But, additionally, it has been suggested that trainees receive one or more practical courses in such things as, for example, "Methodology of safe handling and applying of toxic chemicals in agriculture", or "Methods of land preparation and planting", or "Simple economic comparison of alternatives in subsistence farming practices". And for LDC students doing degree programs in U.S. universities, it has been suggested that some training in research organization and management be provided, since it will be from among these individuals that the research administrators will likely be selected.

Despite the low ranking accorded language capability of U.S. scientists, we still wish to emphasize the need for personal communication between the U.S. and LDC persons, including LDC farmers who most frequently are unable to converse in English. Indeed, if our efforts are to have any direct impact on the "poorest of the poor" farmers in the chosen countries, the ability to communicate relatively easily with a range of persons will be a necessity. Undoubtedly, in many countries, language facility beyond English will be required.

A P P E N D I X G

DRAFT JOINT RESEARCH OUTLINES

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

SENEGAL

I. Proposed Research

A. Topic: A program to improve the quality of cowpea varieties for production and utilization in semi-arid zones.

B. Constraint Area(s) to be Addressed

Limitations of the Physical Environment
Plant Pests and Diseases
Plant Response Limitations
Nutrition, Food Preparation & Health
Farming Practices

C. Description of Proposed Research (production and non-production)

1. Screening identified material; breeding for drought and high temperature, and pest resistance.
2. Identifying farming techniques suitable for small farms which support the developed characteristics.
3. Entomological protection of crop.
4. Assessing nutritional value of varieties for human consumption.

D. Anticipated Long-range research goal(s)

Food self-sufficiency and improvement of nutrition and income for farm families.

E. First Year Objective(s)

1. Development of field trial design.
2. Initiate field trials.
3. Initiate program of education (identify student, apply to institution, commit funds for first year scholarship).
4. Definition of a long term research program.

F. Type of Professional Personnel Required

Senegal: 3 researchers
2 upper level technicians (ITA, IUT, BISH)
2 Technicians (ATA, BTH)

U.S.: 3 researchers
6 undergraduate students
2 Technicians

141

Country Senegal

II. Potential Collaborators

Host Country - P.I.:	M.N. Ndoye	Entomologist	CNRA, Bambey
Co-Investigators:	C. Dancette	Agronomist	CNRA, Bambey
		Bio-climatologist	
U.S. - P.I.:	A.E. Hall	Agronomist- Plant Physiologist	Dept. Botany & Plant Sci., Univ. Calif.- Riverside
	V. Marcarian	Agronomist- Plant Breeder	Dept. Plant Sciences, Univ. Arizona, Tucson
	K.W. Foster	Plant Breeder- Geneticist	Dept. Agronomy & Range Sci., Univ. Calif.- Davis

III. Anticipated Procedures

A. Proposed research site(s):

SENEGAL - CNRA at Bambey and its field stations at Louga, Thilmakha and Thienaba.

U.S. - Three field sites have been chosen in the U.S. which are appropriate for cowpea production and which have contrasting climates and soils. The University of California Agricultural Experiment Stations at Riverside and Davis and the University of Arizona Agricultural Experiment Station at Yuma-Mesa.

B. Proposed research methodology in brief:

SENEGAL -

1. Improved varieties
 - a. Establish short cycle varieties resistant to drought.
 - b. Establish erect varieties with flowering grouped in time and space.
 - c. Establish varieties resistant to thrips and jassides.
 - d. Improve fertility rate.
 - e. Establish cowpea forage varieties.

141

Country Senegal

2. Entomological protection
 - a. Assess control methods and their economic value.
 - b. Inventory the ecology of cowpea insects in the country.
 - c. Study the pest resistance of identified varieties.
 - d. Coordinate field trials with other countries in the Bean/Cowpea CRSP.
 - e. Study the relationship of cowpea insects and mixed cropping patterns.
3. Farming practices
 - a. Put in place mixed cropping field trials.
 - b. Study cowpeas in pure stands and in mixed cultures.
 - c. Study seed density in relation to water

U.S. - Experimental lines and cultivars will be selected from cowpeas developed by the U.S. collaborators, ISRA (Senegal), IITA and other organizations. These cowpeas will be evaluated at the three contrasting field sites in the U.S. to permit selection of parent material for specific breeding programs. The field sites will also be used for evaluating the progeny produced by these breeding programs and crop management methods.

At Riverside, California cowpeas will be evaluated for drought resistance by growing them under different controlled levels of water supply in field conditions. These studies will be conducted during the hot, dry summer season when the absence of rain permits control of water supply through the use of stored soil moisture and supplemental irrigation. Data will be collected on agronomic, physiologic and morphologic characters with emphasis on yield, earliness, root development and osmotic adjustment. Screening procedures will be developed for characters that improve adaptation to drought for subsequent use by the research team in Senegal. Cowpeas will be grown with different row widths and plant spacing. Yield, crop growth and hydrologic balance will be measured to determine the plant spacings and rooting characteristics that are optional for dry-land cropping.

At Yuma-Mesa, Arizona cowpeas will be evaluated for resistance to high temperatures. Initial field studies will be conducted under optimal irrigation during a season where daily air temperatures exceed 40°C on many days. Data will be collected on agronomic and physiologic characters with emphasis on yield, and

Country Senegal

flower and pod abscission. Screening procedures will be developed for characters that improve adaptation to high temperatures.

At Davis, California a general cowpea breeding program has been initiated. At this site, cowpeas will be performance tested under optimal irrigation and the drought produced by growth on stored soil moisture alone. Screening and breeding for resistance to pests (e.g. cowpea weevil and nematodes) and diseases.

C. Approximate time schedule over first year:

SENEGAL - February 1981 - Scientific meeting, elaboration of program and protocol
July - September 1981 - Plant and conduct field trials
September 1981 - Evaluate
December 1981 - Report results of first year evaluations and make additional plans for long term program

U.S. - During the first month of the project the U.S. collaborators will meet in the U.S. to develop a detailed plan for research at the three sites in the U.S., and to make arrangements for the initial planning meeting with ISRA scientists to be held at CNRA Bambey in Senegal. All field experiments will be sown in the spring, and data will be collected during the summer. Final harvests will be completed by the early fall and data analysis will be completed by the next planning meeting in the winter.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:
 - a. Elaborate the research program and the experimental plan with the collaboration of all the researchers implicated in the project.
 - b. All program activities to take place in Senegal will be under the jurisdiction of the researchers based in Senegal.

2. Anticipated responsibilities of U.S. researchers:

A.E. Hall is responsible for the coordination of research in the U.S., and for promoting interactions between U.S. and ISRA Collaborators through contact with the principal investigator assigned by ISRA. He is also responsible for the studies conducted at Riverside, California (such as the varietal trials and studies of drought resistance and improved crop management methods).

1192

Country Senegal

V. Marcarian is responsible for the studies conducted in Arizona (such as the studies at Yuma-Mesa of resistance to high temperatures).

K.W. Foster is responsible for the studies conducted at Davis, California (such as the varietal trials and studies of pest and disease resistance).

The U.S. researchers will also have specific responsibilities relating to project activities resulting from the joint planning meeting in Senegal (including assisting ISRA research activities in Senegal and contributing to training programs in Senegal and the U.S.).

IV. Training Component (indicate number, levels and sites)

SENEGAL - 1 MS level entomologist (to be trained at Riverside, Davis or MSU), 6 person months of visiting scientist time in the U.S. for selected Senegalese scientists to study cowpea programs and problems in the U.S.

U.S. - During visits to Senegal the U.S. collaborators will provide the training in research methods that is requested by the principal investigator assigned by ISRA. U.S. collaborators will also guide Senegalese students sent to their respective U.S. universities by the principal investigator of ISRA.

144

Country Senegal

V. Estimated Budget for First Year

SENEGAL

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Instituc.	Contrib. from Host Instituc.	Requested from Title XII Expended in US	*Expended in/for Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	50 %	\$	\$ 12,000	\$	\$
b. Co-investigators	1 + 1	30+100	\$	\$ 31,200	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students			\$	\$	\$	\$
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical	1	100	\$	\$ 2,400	\$	\$
f. Technicians	4	100	\$	\$	\$	\$ 39,000
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (if charged as Direct Costs)			\$	\$ 45,600	\$	\$ 35,000
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$	\$	\$	\$
D. Equipment			\$	\$	\$	\$
E. Materials and Supplies			\$	\$	\$	\$ 13,000
F. Travel--1. Domestic (Including Canada, U.S.)				2,000		
2. Foreign						9,000
J. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$	\$
I. Orientation and Medical Expenses			\$	\$ 2,000	\$	\$
J. Publication Costs/Page Charges			\$	\$	\$	\$ 2,000
K. Computer Costs			\$	\$ 5,000	\$	\$
L. All Other Direct Costs			\$	\$ 2,000	\$	\$
M. Training Costs			\$	\$	\$	\$ 10,000
N. Total Direct Costs (C through M)			\$	\$ 56,600	\$	\$ 69,000
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs (30 %)			\$	\$ 20,000	\$	\$ 21,000
P. Total Direct and Indirect Costs (N plus O)			\$	\$ 76,600	\$	\$ 90,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	Dr. THIONGANE	Directeur Général de l'ISRA - Dakar
	Mahawa MBODJ	Directeur du CNRA - Ziguinchor
U.S.		

G/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

145

Country Senegal

V. Estimated Budget for First Year

U. S.

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I. Hall, A. E.	1	30	\$ 9,149	\$	\$	\$
b. Co-investigators	2	10/10	\$ 4,800	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students			\$	\$	\$	\$
d. Pre-Baccalaureate Students a/5		15 wks.	\$	\$	\$ 14,968	\$
e. Secretarial-Clerical		ea.	\$	\$	\$	\$
f. Technicians	2	10/10	\$ 4,332	\$	\$	\$
TOTAL SALARIES AND WAGES			18,281		14,868	
B. Fringe Benefits (if charged as Direct Costs)			\$ 4,527	\$	\$ 297	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B) a/ Field assistants			\$22,808	\$	\$ 15,165	\$
D. Equipment			\$	\$	\$	\$
E. Materials and Supplies—field studies at 3 sites			\$	\$	\$ 11,836	\$
F. Travel—1. Domestic (Including Canada, U.S.) Planning mtg./US scientists					300	
2. Foreign Initial planning mtg./Senegal/3 US scientists			\$2000		6,000	
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$ NA	\$
G. Shipment and Storage of Household Goods			\$	\$	\$ NA	\$
H. Housing Allowances Per diem expenses/Senegal			\$	\$	\$ 450	\$
I. Orientation and Medical Expenses			\$	\$	\$ NA	\$
J. Publication Costs/Page Charges			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$ 200	\$
L. All Other Direct Costs			\$11,543**	\$	\$ 400***	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$34,351	\$	\$ 34,351	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs 11% of MTDC			\$10,649	\$	\$ 10,649	\$
P. Total Direct and Indirect Costs (N plus O)			\$45,000	\$	\$ 45,000	\$

PERSONS PREPARING

THIS DOCUMENT:

Name

Title and Address

Host Country: _____

U.S.

A. E. Hall

Associate Professor, Botany & Plant Sciences
University of California, Riverside

B/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

** Cost of field operations

***Repairs to equipment

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

CAMEROON

I. Proposed Research

A. Topic: Maximizing cowpea yields without pesticides with attention to agronomic practices, the relationship of insect pest cycles, and labor demands on farmers.

B. Constraint Area(s) to be Addressed

- (1.) Limitations due to pests and diseases;
- (4.) Farming Practices Limitations;
- (5.) Storage and Commodity Maintenance;
- (8.) Socio-Cultural Factors

C. Description of Proposed Research (production and non-production)

1. Identify major field and storage insects.
2. Assess effects of these insects on plants.
3. Investigate the biology of the insects.
4. Study the effects of various agronomic practices (e.g. planting date, plant density, intercropping, variety performance).
5. Assess the relationship of overall labor demands on the small farm family to the actual cowpea production.

This research is proposed for a semi-arid zone; is to be conducted in cooperation with the Institut de Recherches Agronomiques of the Government of Senegal and will be coordinated with the activities of IITA, SAFGRAD, SPV/RFCP and other appropriate research services and programs.

D. Anticipated Long-range research goal(s)

1. Produce higher yields of cowpeas without insecticides.
2. Increase the availability of cowpeas for small farm family consumption.
3. Contribute to the knowledge of insects affecting cowpeas under Cameroonian farming conditions.

E. First Year

1. Identify major cowpea insects and the cowpea varieties resistant to them.
2. Identify appropriate agronomic practices and varieties to include in first year field trials.
3. Observe cowpea agricultural practices of small farmers during the growing season and at harvest.
4. Purchase necessary equipment and supplies.

Country Cameroon

F. Type of Professional Personnel Required

A U.S. researcher who will work with the Cameroonian researcher in directing the research, and will supervise a U.S. entomology student working in Cameroon in the field.

A U.S. researcher to facilitate and supervise a Cameroonian student to begin an academic program in entomology in the U.S.

II. Potential Collaborators

Host Country - P.I.:	Mr. Binzi	Soil Science	IRA Maroua
Co-Investigators:	Mr. Djambong	Entomology	IRA Maroua
	Mr. Fobasso	Agronomy	IRA Maroua
U.S. - P.I.:	Dr. Richard Chalfant	Entomology	Univ. of Georgia
	Dr. J.A. Renwick	Entomology	Boyce Thompson Institute

III. Anticipated Procedures

A. Proposed research site(s):

Maroua
Ngaoundere
Sangueri (Garoua)
Soucondou (Guider)
Mokolo

B. Proposed research methodology in brief:

1. Identify the important pests and their biology
2. Test local cowpea varieties most important in the semi-arid zone of north Cameroon in mixed cropping and compare them with improved varieties. Do biological examinations, assessing insects and their parasites. Replicate field trials on plots in different locales assessing the insects, the damage in the critical periods of plant development (flowering) and when most of the pods are formed.
3. Manipulate agronomic practices on local and promising varieties including different densities, in different patterns of mixed cropping to evaluate the insect populations and their damage and the yields gained from acceptable experimental methodologies.
4. Isolate specific insect problems in cages and in laboratory

Country Cameroon

- conditions (plant cages). Raise the insects on the plants in order to determine the type and extent of the parasite.
5. Evaluate control methodologies and experimental methods acceptable on farms. Example: Use of insect juice to reduce insect damage.

C. Approximate time schedule over first year:

June - July: Prepare the fields and put in place the trials

August - September: Observation and assessments

October - November: Harvest--interpretation of results

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

- a. Work in collaboration with the U.S. student and the U.S. supervisor.
- b. Inspect the trial sites, visit the fields to follow the agreed upon activities.
- c. Find housing and office space for U.S. personnel (the student and visiting U.S. researcher). Make vehicle available for their use (maintenance and gas to be paid for by project).

2. Anticipated responsibilities of U.S. researchers:

- a. Provide the supervision for the research activity carried out in the field (including the pests identification) and in the laboratory by the U.S. student
- b. Supervision of the overall trial work of the U.S. student by the U.S. researcher.
- c. Collaborate with the Cameroonian researcher.

IV. Training Component (indicate number, levels and sites)

Cameroon student to study at Masters level and later for Ph.D. Between MS and Ph.D the student must return to work with the project for a while.

149

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

NIGERIA (NSUKKA)

I. Proposed Research

A. Topic: Appropriate Technology for Cowpea Preservation and Processing, and a study of its Socio-Economic Impact on Rural Populations in Nigeria.

B. Constraint Area(s) to be Addressed
Storage and Commodity Maintenance; Production-Consumption Economics; Nutrition, Food Preparation and Health; Socio-Cultural Factors.

C. Description of Proposed Research (production and non-production)

Nigeria produces nearly 1 million Metric tonnes of cowpeas annually. In a national diet characterized by a disproportionate intake of carbohydrates, the content and quality of cowpea protein can make significant improvements in achieving better balance in the dietary pattern. This potential has remained unrealized, particularly in the rural areas and among the urban poor, because of the enormous storage losses of nearly 30% sustained by this crop; the laborious, time-consuming and energy-demanding preparation methods; and the incidence of anti-nutritional factors associated with it. This project is designed to foster the efficient utilization of cowpeas, particularly among Nigeria's rural population and urban poor - specifically, the study will identify and characterize socio-economic, socio-cultural, and technical factors which act to prevent efficient utilization of cowpeas and will provide "solution packages" in the form of an appropriate mix of products, technologies and policy instruments that would promote the resourceful utilization of cowpeas in meeting a substantial part of the protein requirement in the diet of the Nigerian rural people and the urban poor.

D. Anticipated Long-range research goal(s)

1. Establish patterns of cowpea utilization in Nigeria and elucidate the associated socio-cultural and socio-economic factors.
2. Develop a package of appropriate techniques + technologies of cowpeas adapted specifically to satisfy identified needs.
3. Develop policy guidelines (for use of policy makers) to foster efficient utilization of cowpeas through the promotion of consumption, rural industries, and the associated linkage to rural/urban markets and to farming activities in rural areas.

Country Nigeria (Nsukka)

E. First Year Objective(s)

1. Preliminary survey of the socio-cultural and socio-economic status of cowpeas, including usage patterns in selected communities of the local government area (county) of Anambra State of Nigeria. Survey and measurements will show the role of cowpeas in the nutritional status of target communities.
2. Survey of existing and potential technologies for cowpea processing. Development of a low-cost and effective technology for dry-dehulling of cowpeas.

F. Type of Professional Personnel Required

Faculty and technicians at the University of Nigeria and the University of Georgia

II. Potential Collaborators

Host Country - P.I.:	P.O. Ngoddy	Food Eng.	Dept. of Food Sci.
Co-Investigators:	Z.A. Obanu	Food Chemist	Univ. of Nigeria
	I.C. Obizoba	Nutritionist/ Food Analys.	Univ. of Nsukka
	D.O. Nnanyeluga	Nutritionist	Univ. of Nsukka
	N.D. Onwuka	Chem. Engr.	Univ. of Nsukka
	V.I. Innorah	Home Econ.	
	A. Dike	Sociologist	Dept. of Soc./ Anthropology
U.S. - P.I.:	Kay H. McWatters	Food Sci.	
	M.S. Chhinnan	Food Engr.	Univ. of Georgia
	R.D. Phillips	Nutritionist	Experiment, GA
	R.E. Worthington	Lipid Chemist	30212, USA
	L.R. Beauchat	Food Microbio.	

III. Anticipated Procedures

A. Proposed research site(s):

1. University of Nigeria, Nsukka: Depts. of Food Science, Home Economics, and Sociology and Anthropology.
2. University of Georgia: Dept. of Food Science (Experiment, GA).
3. Fieldwork and surveys will be carried out in selected communities in Nigeria chosen to give a representative

Country Nigeria (Nsukka)

picture of the national patterns of cowpea utilization. In the long-term, Nigeria will be divided into 4 ecological zones. Representative communities will be selected in each zone. Surveys will begin in the East zone 1st year.

B. Proposed research methodology in brief:

In the first year, two specific studies will be pursued in parallel:

1. Questionnaire-based study designed to elucidate socio-cultural and dietary factors in cowpea factors in cowpea consumption. Anthropometric and household measurements will be taken. Identification and evaluation of prominent cowpea varieties, storage practices, processing, utilization, and acceptability of cowpea products will be undertaken. Chemical, biological, and sensory methods will be applied.
2. Surveys of available techniques for milling cowpeas in various parts of the world through enquiries and visits, where necessary, will be done. Information will be screened and synthesized. Complementary work on process development, hardware design, fabrication, and testing of flours will be undertaken for cowpea dehulling. Effort will be primarily directed toward developing a dry-dehulling method. Preliminary analysis of dehulled cowpeas for assorted potential uses will be carried out.

For the long-term (5 years), surveys and associated measurements shall be expanded to encompass the entire country of Nigeria to establish a reliable national picture of cowpea usage patterns, its socio-cultural, and nutritional significance. Collateral laboratory and pilot plant studies centered on product development from cowpea flours, quality assessment, and technical innovation will go forward. In all cases, product acceptance and technological appropriateness will be determined on the basis of the extent to which the needs of rural population and urban poor can be satisfied. A systematic build-up of competencies at the Univ. of Ife (Nigeria) will be pursued to make it possible for the Nigerian research team to achieve self-reliance and to be able to commence research in new directions.

C. Approximate time schedule over first year:

1. Field surveys and study in Nigeria - 6 months; Chemical, organoleptic and nutritional analysis of cowpeas and traditional products of cowpeas in Nigeria - 4 months; Study of existing cowpea processing technologies, synthesis of information, design, prototyping, fabrication,

153

Country Nigeria (Nsukka)

and testing of cowpea dehulling hardware - 6 months;
Compilation of data, analysis and report - 1 month.
Activities will run concurrently.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

1. Design of questionnaire consultatively with American counterparts.
2. Anthropometric measurements
3. Laboratory analysis - proximate biological, and organoleptic.
4. In conjunction with American counterparts, survey cowpea processing technologies.
5. Collaboratively with American counterparts, undertake synthesis, design and testing of new processes and equipment.
6. Interpretation of data.
7. Collectively prepare and publish final reports of findings.

2. Anticipated responsibilities of U.S. researchers:

In addition to collaborative responsibilities with Nigerian researchers outlined above concerning design of questionnaire, surveys of cowpea processing technology, testing of process and dehulling equipment, interpretation of data, and preparing reports, the U.S. side shall be responsible for carrying out appropriate statistical analysis of data, conducting chemical (amino acid, B vitamins) and biological (PER) analysis of unprocessed and processed cowpeas and products, and evaluation of organoleptic properties of cowpeas and products as affected by methods of treatment and preparation; to advise and train Nigerian students engaged in research in the U.S.

IV. Training Component (indicate number, levels and sites)

Year 1 - One Nigerian graduate student at University of Georgia

Years 2, 3, 4, and 5 - One graduate student each year, two post-doctoral research associates (Nigerian) over four years (University of Georgia and University of Nigeria)

154

Country Nigeria (Nsukka)

V. Estimated Budget for First Year

	Time % on CRSP	Proposed Budget Estimate			
		Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII Expended in US	*Expended in/for Host Country
A. Salaries and Wages					
1. Senior Personnel					
a. P.I.	1 25	\$ 7,000	\$ one	\$	\$
b. Co-investigators	4 30	\$ 6,500	\$ six	\$	\$
2. Other Personnel (Non-Faculty)					
a. Research Associates-Postdoc		\$	\$	\$	\$
b. Other Professionals		\$	\$	\$	\$
c. Graduate Students		\$	\$	\$	\$ 5,500
d. Pre-Baccalaureate Students		\$	\$	\$	\$
e. Secretarial-Clerical		\$	\$ Yes	\$	\$
f. Technicians		\$	\$	\$	\$
TOTAL SALARIES AND WAGES		13,500			
B. Fringe Benefits (if charged as Direct Costs)		\$ 2,970	\$ Yes	\$	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)		\$ 16,470	\$	\$	\$ 5,500
D. Equipment		\$	\$ Yes	\$ 8,000	\$ 15,000
E. Materials and Supplies		\$	\$ Yes	\$ 9,500	\$ 9,915
F. Travel--1. Domestic (Including Canada, U.S.)				1. 1,200	1. 4,000
2. Foreign				2. 2,800	2. 8,000
3. Accompanying Dependents (for long-term assignments)		\$	\$	\$ 4,000	\$ 12,000
G. Shipment and Storage of Household Goods		\$	\$	\$	\$
H. Housing Allowances		\$	\$	\$	\$
I. Orientation and Medical Expenses		\$	\$	\$	\$
J. Publication Costs/Page Charges		\$	\$	\$	\$
K. Computer Costs		\$	\$	\$ 1,000	\$
L. All Other Direct Costs		\$	\$ Yes	\$	\$
M. Training Costs		\$	\$ Yes	\$	\$
N. Total Direct Costs (C through M)		\$ 16,470	\$	\$	\$ 42,415
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)		\$ 7,201	\$ Yes	\$	\$ 2,585
Total Indirect Costs 46.6% of S & W		\$ 23,761	\$	\$ 22,500	\$ 45,000
P. Total Direct and Indirect Costs (N plus O)					

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	<u>P. O. Nnoddy</u>	<u>Professor of Food Engineering & Head Dept. of Food and Home Sciences, University of Nigeria, Nsukka, Nigeria.</u>
U.S.	<u>L. R. Bauchar</u>	<u>Associate Prof., Dept. of Food Science, Univ. of Georgia, Experiment GA 30212 USA</u>

U/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

150

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

NIGERIA - IBADAN/JOS

I. Proposed Research

A. Topic: Medical problems associated with feeding cowpeas to children

B. Constraint Area(s) to be Addressed

- (7.) Nutrition, Food Preparation and Health
- (8.) Socio-Cultural Factors

C. Description of Proposed Research (production and non-production)

Discussion in Nigeria confirmed the relative reluctance of mothers to use cowpeas in infant feeding especially under the age of one year. Bloating, diarrhea and cramping are some reported side effects in children of weanling age. Sudden death while asleep, commonly known in Yoruba language as "soku dale" (death at night) is believed by mothers to be related to a particular cowpea diet when fed to babies late at night. Clinicians working in this area believe that problems with cowpea consumption are more common with feeding of whole grain rather than de-hulled cowpea, occur more commonly in babies under nine months of age and only in about 10 percent of these under one year, but much less thereafter. These notwithstanding, the use of dietary cowpeas in older children is fairly widespread. Specific factors responsible for such side effects have not been studied before. This proposal is aimed at investigating the major causal factors in a systematic way by starting with community survey to obtain baseline information on socio-cultural factors associated with cowpea use and continuing with animal experiments to explore the toxicity of cowpea testa constituents and including infant feeding studies at demonstration communities.

D. Anticipated Long-range research goal(s)

These include increasing the use of cowpea as low cost source of protein for infant feeding in Third World countries by identifying and eliminating factors that produce undesirable effect as well as determining ways of increasing acceptance in day to day use of cowpea by currently reluctant mothers once less disturbing types are developed.

E. First Year Objective(s)

- IBADAN - 1. Develop, standardize and pilot test survey instrument for assessing prevalence of side effects, attitude, etc.
- 2. Profiling the constituents of cowpea testa and

Country Nigeria - Ibadan/Jos

evaluating the "toxicity" of such constituents in animal experiments.

- 3. Identify and study the 10 percent of older children who develop side effects with cowpea diets.
- 4. Determine changes in microbial colonization of intestinal tract of children following regular cowpea consumption.

- OS -
- 1. Train professionals in use of Breath Hydrogen Analyzer in metabolic studies.
 - 2. Determine changes in G.I. transit time associated with feeding of cowpea meals to children (weanlings)
 - 3. Determine associated changes in immune globulin profile of children who react to cowpea meals.
 - 4. Describe changes in intestinal microbial flora associated with cowpea meals.

F. Type of Professional Personnel Required

Physicians, chemical pathologist, food scientist, nutritionists, microbiologist, epidemiologist

II. Potential Collaborators

I B A D A N

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.:	Prof. A. Omololu	M.D./Nutritionist	Dept. of Human Nutrition U. of Ibadan
U.S. - P.I.:	C. Amechi Akpom	M.D./Epidemiologist	Col. of Human Medicine -MSU
	David S. Greenbaum	M.D./Gastroenterologist	Col. of Human Medicine -MSU
	P. Markarkis	Food Scientist	Dept. of Food Sci. -MSU
	Wanda Chenoweth	Food Scientist	Dept. of Food Sci. -MSU
	Harold Sadoff	Microbiologist	Dept. of Microbiology & Public Health -MSU

151

Country Nigeria - Ibadan/Jos

II. Potential Collaborators (cont.)

J O S

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.:	David Drew MRCP	Pediatrician	Faculty of
Co-Investigators:	Peter Isichie MD	Chem. Path.	Medical
	Nicholas Okere MBBS	Comm. Med.	Sciences/ Jos
U.S. - P.I.:	C. Amechi Akpom MD	Epidemiologist	Col. of Human Med.
	P. Markakis, Ph.D.	Food Scientist	Dept. of Food Sci.
	Wanda Chenoweth Ph.D.	"	"
	Harold Sadoff, Ph.D.	Microbiologist	Dept. of Microbiology
	David S. Greenbaum	Gastroenterologist	& Public Health -MSU

III. Anticipated Procedures

A. Proposed research site(s):

IBADAN - University of Ibadan, Ibadan, Nigeria
 University of Jos, Jos, Nigeria
 Michigan State University, East Lansing, Michigan, USA

JOS - University of Jos, Jos, Nigeria
 University of Ibadan, Ibadan, Nigeria
 University of Nigeria, Nsukka, Nigeria
 Michigan State University, East Lansing, Michigan, USA

B. Proposed research methodology in brief:

IBADAN - Methodologies are summarized under each study heading.

Study (1). Survey instrument development and standardization: Questions to be used will be contributed by participants from various component areas and coordinated from the University of Nigeria, Nsukka as part of their other surveys. Pilot to be done at Nsukka and Jos. Data analysis to be carried out at Michigan State University, i.e., reliability, validity, content analysis. etc.

*Country Nigeria - Ibadan/Jos

Study (2). Brief interview survey of all women at Osegere Village (a demonstration village) to identify attitudes of mothers and others to feeding cowpeas to their children. Following this, children at the village will receive supplementary feeding to attempt to identify any side effects.

Study (3). Profiling of constituents of cowpea testa: Limited literature survey to be undertaken at Ibadan and MSU will be done to determine the already known potentially "toxic" substances in testa. In addition, testa from dehulled cowpeas will be homogenized, fractionated and analysed by Food Scientists at MSU. Animal experiments will be done to determine gastro-intestinal toxic effects in a controlled study design.

Study (4). To determine changes in microbial colonization of intestinal tract. Stool from children fed on cowpeas and from controls will be collected, individually homogenized, plated out and inoculated into transport medium for immediate transmittal to Michigan State University for identification, quantification and qualitative evaluation of organisms in them.

JOS - Methodologies are summarized under each study heading.

Study (1). Development and Standardization of Survey Instrument - Questions relating to medical aspect of cowpea consumption to be contributed from Jos faculty. But conduct of Pilot survey to be coordinated by participating staff at University of Nigeria, Nsukka. Jos will be one of the survey locations.

Study (4). Determination of microbial colonization of intestinal tract of children fed on cowpea - Stool to be collected from children fed on cowpeas and a control diet as well as from other controls, then individually homogenized, plated out and inoculated into transport media for immediate transmittal to Michigan State University where identification, quantification and qualitative evaluation of content will take place.

Study (4b). Determine immunoglobulin profile of children reacting to cowpea food: Blood samples taken from children before and after cowpea meals over periods of time will be analyzed to provide immunoglobulin profile. Comparison will be made between reactors and non-reactors. Samples to be retained for later agglutinin identification.

Study (4c). Determine intestinal transit time of cowpea meals in children: Plan is to use radio-opaque pellets in cowpea meal to measure transit time by X-raying timed stools collected in paper boxes.

Training program: In anticipation of needed metabolic

151

Country Nigeria - Ibadan/Jos

studies in Year II, the pediatrician will visit Michigan State University for a short training in the use of Breath Hydrogen Analyzer for metabolic studies in children. On his return he will train at least one individual from the other two participating institutions in the use of the instrument.

C. Approximate time schedule over first year:

IBADAN - Instrumentation, standardization, pilot, analysis of data - 9 months. Animal experiments, profiling of test constituents - 10 months. Identification and study of children with side effects, after cowpea meals - 10 mos. Microbial colonization study - 6 months. Report - 2 months. All studies to be conducted concurrently.

JOS - Pilot Community Survey Instrument Standardization, analysis of data - 9 months. Microbial colonization of study - 6 months. Immunoglobulin component survey of serum of reacting children - pilot 6 months. Study of G.I. transit time - 6 months.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

IBADAN - a. Participating in compilation of questions for use in construction of survey instruments on socio-cultural and health related factors in cowpea consumption.
b. Screening interview and test feeding of children to define the prevalence and identify children who develop diarrhea following cowpea consumption.
c. Obtaining stool samples from children who are fed on cowpeas and their controls according to predetermined protocol.
d. Training or technicians for use in microbial colonization study.
e. Performing limited literature survey to identify known testa "toxic" factors.

OS - a. Participation in compilation of questions for use in developing survey instrument.
b. Obtaining stool samples from children fed on cowpeas and their controls and conducting initial routine stool examination before forwarding to Michigan.
c. Examination of serum protein profile in children with side effects from cowpea consumption.

Country Nigeria - Ibadan/Jos

- d. Training participants from other centers in use of Breath Hydrogen Analyzer techniques.
- e. Study of G.I. transit time of cowpea feeds in children.

2. Anticipated responsibilities of U.S. researchers:

- IBADAN -
- a. Participating in instrument development and computer analysis of data from pilot survey to report on standardization of data--reliability, validity, testing, content analysis.
 - b. Limited literature review for known "toxic" constituents of cowpea testa and profiling of constituents of testa.
 - c. Conducting animal experiments to test for "toxicity" of constituents on the gastrointestinal tracts of animal models.
 - d. Identification, and quantification of intestinal flora of children fed on cowpeas, (using stool samples).

- JOS -
- a. Participating in instrument development and computer analysis of data from pilot survey to report on standardization of data--reliability, validity, testing, content analysis.
 - b. Limited literature review for known "toxic" constituents of cowpea testa and profiling of constituents of testa.
 - c. Conducting animal experiments to test for "toxicity" of constituents on the gastrointestinal tracts of animal models.
 - d. Identification, and quantification of intestinal flora of children fed on cowpeas, (using stool samples).

IV. Training Component (indicate number, levels and sites)

IBADAN - Training of one full time equivalent of field workers for use in feeding studies and in stool collection studies during the first year.

- JOS -
- 1. Pediatrician from Jos to visit M.S.U. for 2 week training in use of Breath Hydrogen Analyzer techniques for metabolic studies in children.
 - 2. Pediatrician to subsequently train three other indigenous participants; one from each site.

161

Summary of Budget (First Year) NIGERIA

(MSU, Ibadan & Jos combined)

	Contribution from N.S.U.	Expended in U.S.	Requested from Title XII
C. Salaries, Wages and Fringe Benefits	\$25,944	\$14,450	\$26,620* (Ibadan & Jos)
D. Equipment	-	3,010	3,500
E. Materials & Supplies	-	3,000	4,100
F. Travel			
1. Domestic (for host country participants)	-	-	2,780
2. Foreign	-	-	3,000
3. Accompanying Dependents	-	-	500
G. Shipment & Storage (Air freighting of specimens)	-	-	3,500
J. Publication Cost	-	500	-
K. Computer Cost	-	1,500	-
M. Training Cost	-	-	1,000
N. Total Direct Cost:	\$25,944	\$22,500	\$45,600

*Includes \$4,500 to be expended in the U.S. on behalf of host country graduate student

1/6/2

Country Nigeria (Ibadan)

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			*Contrib. from US Instituc.	Contrib. from Host Institut.	Requested from Title XII	*Expended in US
<div style="border: 1px solid black; padding: 2px; display: inline-block;">*U.S. contribution & Expenditure shown on Ibadan budget</div>						
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	2	15%	\$	\$	\$	\$ 2,500
b. Co-investigators	2	10%	\$	\$	\$	\$ 2,000
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students			\$	\$	\$	\$
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical	1	50%	\$	\$	\$	\$ 1,500
f. Technicians (2 labs, 3 inter-views)	5	25% (avg.)	\$	\$	\$	\$ 4,500
TOTAL SALARIES AND WAGES						10,500
B. Fringe Benefits (if charged as Direct Costs)			\$	\$	\$	\$ -
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$	\$	\$	\$10,500
D. Equipment (Breath Hydrogen Analyzer)			\$	\$	\$	\$ 2,000
E. Materials and Supplies			\$	\$	\$	\$ 1,500
F. Travel--1. Domestic (Including Canada, U.S.)						1,000
2. Foreign						
3. Accompanying Dependents (for long-term assignments)						
G. Shipment and Storage of Household Goods			\$	\$	\$	\$ 500
H. Housing Allowances			\$	\$	\$	\$
I. Operation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Page Charges			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$	\$
L. All Other Direct Costs			\$	\$	\$	\$
M. Training Costs			\$	\$	\$	\$ 1,000
N. Total Direct Costs (C through M)			\$	\$	\$	\$20,000
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			\$	\$	\$	\$
P. Total Direct and Indirect Costs (N plus O)			\$	\$	\$	\$

PERSONS PREPARING

THIS DOCUMENT:

	Name	Title and Address
Host Country:	David Drew M.R.C.P.	Lecturer in Pediatrics, Faculty of Medical Sciences
U.S.:	C. Amachi Akpan, M.D., Ph.D.	Dept. of Community Health Science, Michigan State University, East Lansing, Michigan

S/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

163

Country Nigeria (Jos)

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	2	15 (avg)	\$ 6,300	\$ 1,000	\$ -	\$ 1,000
b. Co-investigators	4	10 (avg)	\$ 10,000	\$ -	\$ -	\$ 3,000
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	-		\$ -	\$ -	\$ -	\$ -
b. Other Professionals	2	50	\$ -	\$ -	\$ 6,000	\$ 1,000
c. Graduate Students	2	50* (one host country student in U.S.)	\$ -	\$ -	\$ -	\$ 6,444
d. Pre-Baccalaureate Students			\$ -	\$ -	\$ -	\$ -
e. Secretarial-Clerical	2	25 (avg)	\$ 2,500	\$ -	\$ 2,500	\$ 1,400
f. Technicians	2	30 (avg)	\$ -	\$ -	\$ 2,000	\$ 3,186
TOTAL SALARIES AND WAGES			18,800	1,000	10,500	16,120
B. Fringe Benefits (if charged as Direct Costs)			\$ 7,144	\$ -	\$ 3,990	\$ -
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 25,944	\$ 1,000	\$ 14,490	\$ 16,120
D. Equipment			\$ -	\$ -	\$ 3,010	\$ 1,500
E. Materials and Supplies			\$ -	\$ -	\$ 3,000	\$ 2,000
F. Travel--1. Domestic (including Canada, U.S.) (Domestic for Nigerian counterparts within Nigeria)						1,780
2. Foreign						
3. Accompanying Dependents (for long-term assignments)			\$ -	\$ -	\$ -	\$ -
G. Shipment and Storage of Household Goods (Air freighting specimen)						\$ 3,000
H. Housing Allowances			\$ -	\$ -	\$ -	\$ -
I. Orientation and Medical Expenses			\$ -	\$ -	\$ -	\$ -
J. Publication Costs/Page Charges			\$ -	\$ -	\$ 500	\$ -
K. Computer Costs			\$ -	\$ -	\$ 1,500	\$ -
L. All Other Direct Costs			\$ -	\$ -	\$ -	\$ -
M. Training Costs			\$ -	\$ 550	\$ -	\$ -
N. Total Direct Costs (C through M)			\$ 25,944	\$ 1,550	\$ 22,500	\$ 25,000
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)			\$ -	\$ -	\$ -	\$ -
Total Indirect Costs			\$ -	\$ -	\$ -	\$ -
Total Direct and Indirect Costs (N plus O)			\$ -	\$ -	\$ -	\$ -

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	<u>Professor A. Omololu, M.D.</u>	<u>Chairman</u> <u>Dept. of Human Nutrition</u> <u>University of Ibadan, Ibadan, Nigeria</u>
U.S.:	<u>C. Amechi Akpom, M.D., Ph.D.</u>	<u>Associate Professor, Dept. of Community Health Science, Michigan State University</u> <u>East Lansing, Michigan 48823</u>
B/C PLANNING OFFICE REPRESENTATIVE	<u>Pat Barnes-McConnell</u>	

* Includes foreign travel and training for host country nationals in the U.S.

161

Rationale for Proposed Research

The use of cowpea in diets in West Africa is so widespread that there is a tendency to assume that problems associated with its use can be ignored because they are small when compared with the extent of its use in the diet. As someone said, "I am prepared to give cowpea the benefit of the doubt due to its performance so far". While this view may be tenable for the general population, it definitely is questionable when it concerns specific subgroups of the population, such as weanlings and younger children. Furthermore, the questionableness increases when cowpea utilization is considered in relation to specific purposes.

Specifically, if one of the purposes is to increase production so that cowpeas may serve as a low-cost source of protein at periods or in areas where animal protein may not be available, then the current pattern of use of cowpea will not facilitate cowpea use in the weanling age group. Available documentation shows that cowpea is not a popular food item for weanling children. Yet weanlings and younger children are subgroups of the population who are highly vulnerable to protein calorie malnutrition. Hence, in spite of achieving increased cowpea production, availability of cowpea in the diets of these age groups will remain unchanged. This is because parents would not only continue to avoid feeding cowpeas to their children but in instances where children had to be fed cowpea (as during periods of famine), parents would attribute undesirable health outcomes to cowpeas, whereas other factors, many of which are present in Third World Countries, may be responsible for the poor outcomes.

While a web of complex factors are involved in non-use of cowpea in weanling diet or diets of younger children one category that is commonly pointed to is the undesirable effects of cowpea consumption in the age group of concern. Such undesirable effects have been amply documented in West Africa and include bloating, flatulence, cramps and in some cases diarrhea. In developing our hypotheses on the relationship of cowpea consumption to diarrhea in weanlings, the M.S.U. principle investigators had suggested that undigestible oligosaccharides (isolated by one of us - P.M. et al.) in cowpea might be acting as fermentable substrate which when acted upon by intestinal flora would release not only gases but also by-products which might encourage the development of osmotic type diarrhea. This hypothesis is, as yet, not tested. But our effort seems to be one of the first serious ones directed at examining the relationship between cowpea consumption and some of the several side effects: documentation of the occurrence of side effects, notwithstanding. As an example, while extensive research work is currently going on at several locations in Nigeria on various aspects of cowpea nutrition and food preparation, (such as the development of new cowpea dishes, supplementation of cowpea meals, processing, daily sale of cowpea fritters, etc.), very little effort is directed at the medical and/or health aspects of dietary cowpea. Specifically, little work is currently going on with respect to determining factors that are etiologic to the several undesirable effects. Since this determination is basic to being able to reduce the incidence of such effects, either through plant breeding, cowpea processing or any other means, it seems surprising that not much has been done about this important aspect of cowpea use.

That the impression of neglect is not primarily a result of our ignorance is the confirmation provided by many internationally respected Nigerian scientists who are directly involved in cowpea research. For example, Dr. Bede Okigbo, the Deputy Director of the International Institute of Tropical Agriculture (IITA) stated that as far as he knew, no one was examining that health aspect of cowpea

consumption. Professor Oduntan, the Chairperson of the Institute of Social and Preventive Medicine at the University of Ibadan attested to the same fact. She has been involved with well-baby and school health clinic work in Ibadan over the past 16 years and confirms that mothers would not feed cowpea meals to their children because of the undesirable effects. Mrs. Williams, the co-author of the well known book Cowpeas: Home Preparation and Use in West Africa and the author of the monograph entitled A Preliminary Study of Consumer Preferences in Choice of Cowpeas - Western and Kwara States Headquarters and Areas in Nigeria, also stated that no one was examining this problem. Professor Omololu, the Chairman of the Department of Human Nutrition at the University of Ibadan who has been working on the nutritional value and use of Nigerian cowpea meals for several years, himself a physician as well as a nutritionist, confirmed that no one as yet is looking at that question. Yet they all agreed that it is an important aspect that deserves intensive examination.

In order to justify their views on the scope and importance of this problem, Dr. Oduntan described the common belief among Yoruba mothers that infant death at night "Soku Dale" is related to cowpea diet fed to infants and children earlier that night. She agreed that while this might really be "cot deaths" which are common in those age groups, the fact of continued association in the minds of mothers does not help the use of this important item of diet in this age group who can benefit the most from it. On the other hand, if the cumulative experience of mothers over several generations had resulted in valid conclusion regarding the association, it seems worthy of scientific inquiry directed at establishing true causal relationship. Dr. Omololu provided more specific information based on clinical experience of nutritionists in that part of the country over several years. He stated that undesirable effects:

- (1) are more common in children below the age of 9 months.
- (2) occur in about 10% of children under one year of age
- (3) are less common in children over the age of one year
- (4) may occasionally be encountered among adults
- (5) tend to be more commonly associated with cowpea meals prepared from whole grain as opposed to dehulled grains.

The above information, considered on their own, raise several interesting questions. (a) At a global level, are these problems specific to a particular type of cowpea produced in Nigeria or are they commonly encountered at other places in Latin America, the Caribbean, and southern United States?

(b) Are these effects induced by "toxic" substances contained in the testa (hulls) of cowpea? In this respect about 4-5 such potentially toxic substances are already known to be present in the hull of cowpea.

(c) If the problems are host related, do they have a genetic basis similar to the 6-G.P.D. deficiency problems encountered with fava beans?

(d) Are the changes in incidence of side effects with age related to enzyme maturation or enzyme induction?

(e) Do these effects have immunologic basis which expresses itself only in atopic individuals?

(f) Are these side effects related to the methods of food preparation which produce compounds that act as haptens and induce hypersensitivity?

- (g) Could there be a delay in gastro-intestinal transit time which allows time for bacterial production of enterotoxins that cause these effects?
- (h) Who are the 10% of children that develop undesirable effects following ingestion of cowpea meals?
- (i) What is the etiology of "Soku Dale"?
- (j) Are most of the unpleasant side effects known?

Although undesirable effect is said to occur in about 10% of children under one year of age, its impact is clearly more widespread since most mothers are unwilling to take the risk. It therefore seems particularly important both to identify the characteristics of that 10 percent so that primary preventive measures can be undertaken by mothers and to identify factors that are responsible for the side effects so that they may be removed from cowpea meals, either prior to or during cowpea meal preparation.

The above questions are only preliminary since answers to most of them would raise other specific questions which may need to be answered. It will be seen that studies suggested for the first year of the project are designed to provide the first order information needed to unravel aspects of problems within the research constraint area: nutrition, food preparation, and health.

The expertise and types of scientists participating in the collaborative studies have been carefully selected to allow for multidisciplinary examination of this very complex problem. The involvement of host country personnel in this project is significant. Training programs are included as part of the first year activity and are designed to provide multiplier effect which will facilitate both objectives of studying problems within the constraint area and improving technological capabilities of host country scientists. The complementary nature of the different components of work assigned to host country scientists and M.S U. scientists attests to the true nature of the collaborative arrangement that has been proposed.

Finally, it must be emphasized that successful completion of our research would provide findings which have direct application to the work that is proposed by our counterparts at the University of Georgia in Athens, Georgia, and the University of Nigeria, Nssuka. Hence, offending components can be removed from beans that are used in the preparation of cowpea flour. This will then be tested for acceptability in traditional food and be subjected to sensory evaluation. The advantage being that the entire work would be done in the same host country.

167

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

KENYA

I. Proposed Research

- A. Topic: Drought and heat resistance in disease-resistant beans for semi-arid regions
- B. Constraint Area(s) to be Addressed: Plant Response, Farming Prac.
- C. Description of Proposed Research (production and non-production)

To evaluate the climatic and physiological factors related to flower/pod abscission; to breed for small farms in semi-arid areas bean cultivars which are resistant to drought, heat and diseases; to provide training for Kenyan scientists in the agricultural sciences; to study the roles of women and men in bean culture on small farms; to cooperate with other scientists in Kenya and international organizations in extending knowledge and adaptability of beans, and of increasing yield.

- D. Anticipated Long-range research goal(s).

Analysis of biological, varietal and physical forces of the environment affecting plant performance with major emphasis on the development of drought, high temperature resistant cultivars with resistance to common diseases.

- E. First Year Objective(s)

To evaluate potentially useful cultivars in field trials in Kenya and the U.S.; to study the roles of women and men in bean culture on small farms in semi-arid areas; to identify personnel for scientific training.

- F. Type of Professional Personnel Required

Senior scientists, technicians, students, field hands

II. Potential Collaborators

	<u>Researchers</u>	<u>Discipline</u>
Host Country - P.I.:	Daniel Makunya	Breeder - Pathologist
Co-Investigators:	E. M. Gathuru	Virology
U.S. 2 - P.I.:	Barbara Webster	Crop Physiologist
	Giles Waines	Geneticist - Breeder

Country Kenya

III. Anticipated Procedures

A. Proposed research site(s):

Kenya - Kabete, Katumasi, Embu

U.S. - U.C. Davis, U.C. Riverside, South Coast Field Station, Imperial Valley, Tullake

B. Proposed research methodology in brief:

Cultivars will be screened for heat and drought tolerance and disease resistance in Kenya and the U.S.; replicated plots of common beans and tepary beans will be grown on field stations in Kenya and California under both dryland and irrigated conditions; salient physiological factors, including stress, will be measured under laboratory conditions; hybrids will be made between desirable parents of common beans and tepary beans; bean cultivation on small farms will be studied, emphasizing particularly constraints of labor, seed availability and agronomic practices; scientific personnel will be trained in field methodology.

C. Approximate time schedule over first year:

(ongoing - see below)

D. Division of labor:

1. Anticipated responsibilities of host country researchers:
Cultivars resistant to prevalent diseases will be evaluated in Kenya; potential students will be selected for training; purchase of vehicle (pickup truck) for transportation in connection with the project.
2. Anticipated responsibilities of U.S. researchers:
Screen and evaluate cultivars for drought and heat resistance in California; visit to semi-arid areas of Kenya, to study experimental plots there and to visit small farms in appropriate areas; to make hybrids between appropriate cultivars; to meet and confer, and to identify appropriate technical personnel.

IV. Training Component (indicate number, levels and sites)

Kenya - 4 students identified for advanced training; technicians selected and trained for lab and field experiments

U.S. - technicians selected and trained in appropriate laboratory and field techniques.

169

Country Kenya

V. Estimated Budget for First Year - Kenya

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Instituc.	Contrib. from Host Instituc.	Requested from Title XII Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.L.			\$	\$	\$	\$
b. Co-investigators			\$	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students			\$	\$	\$	\$ 36,000
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical			\$	\$	\$	\$ 3,000
f. Technicians			\$	\$	\$ 26,000	\$ 7,000
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (if charged as Direct Costs)			\$	\$	\$ 5,200	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$	\$	\$	\$
D. Equipment			\$	\$	\$	\$ 5,000
E. Materials and Supplies			\$	\$	\$ 3,000	\$ 3,000
F. Travel-1. Domestic (Including Canada, U.S.)					800	20,000
2. Foreign					10,000	4,000
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$	\$
I. Orientation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Page Charges			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$	\$
L. All Other Direct Costs			\$	\$	\$	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$	\$	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs			\$	\$	\$	\$
P. Total Direct and Indirect Costs (N plus O)			\$	\$	\$ 45,000	\$ 90,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	D.N. Ngugi	Acting Dean, Faculty of Agriculture
	E.M. Ghchuru	Lecturar, Crop Science
U.S.	Barbara D. Webster	Professor, Agronomy, U.C. Davis
	J. Giles Waines	Assoc. Prof., Botany & Plant Sciences, U.C. Riverside
B/C PLANNING OFFICE REPRESENTATIVE	Pat Barnes-McConnell	

* Includes foreign travel and training for host country nationals in the U.S.

170

Country Kenya

V. Estimated Budget for First Year - U.S.

7/1/80 - 6/30/81	No.	Time Z on CRSP	Proposed Budget Estimate			
			Contrib. from US Instituc.	Contrib. from Host Instituc.	Requested from Title XII Expended in US	*Expanded in/for Host Country
Salaries and Wages						
1. Senior Personnel						
a. P.I. J.G. Waines/B.D. Webster	2	10/10	\$ 6,188	\$	\$	\$
b. Co-investigators	2	10/5	\$ 5,051	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students			\$	\$	\$	\$
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical			\$	\$	\$	\$
f. Technicians	4	10%ea.	\$ 10,444	\$	\$ 18,267	\$
TOTAL SALARIES AND WAGES			21,683		18,267	
. Fringe Benefits (if charged as Direct Costs)			\$ 5,316	\$	\$ 4,384	\$
Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 26,999	\$	\$ 22,651	\$
. Equipment			\$	\$	\$	\$
. Materials and Supplies			\$	\$	\$ 1,000	\$
. Travel—1. Domestic (Including Canada, U.S.)					800	
2. Foreign 2 trips to Kenya (@ \$2,000 ea.)					4,000	
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$
. Shipment and Storage of Household Goods			\$	\$	\$	\$
. Housing Allowances Per diem expenses in Kenya			\$	\$	\$ 3,300	\$
. Orientation and Medical Expenses (for 2)			\$	\$	\$ -0-	\$
. Publication Costs/Page Charges			\$	\$	\$ -0-	\$
. Computer Costs			\$	\$	\$ -0-	\$
. All Other Direct Costs			\$ 7,352	\$	\$ 600	\$
. Training Costs			\$	\$	\$ -0-	\$
Total Direct Costs (C through M)			\$ 34,351	\$	\$ 34,351	\$
. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs 31% of NTDC (on-campus)			\$ 10,649	\$	\$ 10,649	\$
Total Direct and Indirect Costs (N plus O)			\$ 45,000	\$	\$ 45,000	\$

PERSONS PREPARING THIS DOCUMENT:	Name	Title and Address
Host Country:		
U.S.	J. Giles Waines	Assoc. Prof., Bot.&Plant Sci., UC Riverside
	B. D. Webster	Professor, Dept. of Agronomy, UC Davis
PLANNING OFFICE REPRESENTATIVE	Pat Barnes-McConnell	

Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

TANZANIA

I. Proposed Research

- A. Topic: Breeding beans for disease and insect resistance and determination of economic viability for small farmers.
- B. Constraint Area(s) to be addressed
Non-availability of high-yielding, widely adapted, disease and insect resistant bean cultivars in East African region,
- C. Description of Proposed Research (production and non-production)
1. Collect Tanzanian bean land races and best available cultivars from external sources.
 2. Evaluate germplasm collection for (i) plant characters, (ii) resistance to anthracnose, rust, angular leaf spot, bean common mosaic virus, halo and common bacterial blight, (iii) maturity, (iv) yield, (v) resistance to bean fly in the field and bruchids in storage.
 3. Develop breeding program using best parents.
 4. Undertake surveys to determine present intercropping systems, labor, and other inputs, total production for family consumption and for sale, and the timing of harvest to satisfy various consumption and marketing factors.
 5. Estimate impact of the new cultivars on subsistence-farm family labor inputs and incomes.
- D. Anticipated Long-range research goal(s)
- Production (through breeding) of high yielding, widely adapted, disease and insect resistant cultivars of beans which are acceptable to the subsistence farmer and to the consumer; estimate economic viability of the new cultivars and their impact on incomes and nutrition.
- E. First Year Objectives
1. Germplasm collection of Tanzanian land races and best available external cultivars.
 2. Evaluation of germplasm for agronomic characteristics, disease, and insect resistance.
 3. Economic assessment of direct losses caused by selected diseases and insects.
 4. Study of present farming system to determine inputs and timing of consumption and marketing.
- 176

Country Tanzania

F. Type of Professional Personnel Required

1. Agronomist, Ph.D.
2. Plant Breeder, Ph.D.
3. Entomologist, Ph.D.
4. Plant Pathologist, Ph.D.
5. Agricultural Economist, Ph.D.
6. Field Officer, B.S., Agriculture
7. Field Assistant, Diploma, Agriculture

II. Potential Collaborators

<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.: Dr. B. J. Ndunguru	Crop Physiologist	Morogoro
Co-Investigators: Dr. A.L. Doto	Plant Breeder	Morogoro
Dr. J.M. Teri	Plant Pathologist	Morogoro
Dr. C.L. Keswani	Plant Pathologist	Morogoro
Mr. A.N. Mphuru	Entomologist	Morogoro
Dr. A.K. Karel	Entomologist	Morogoro
Dr. P. Anandajayasekeram	Ag Economist	Morogoro
U.S. - P.I.: Dr. M. J. Silbernagel	Plant Pathologist	USDA-WSU, Prosser
Co-Investigator : Dr. Jean Due	Ag Economist	U. of Ill., Urbana

III. Anticipated Procedures

A. Anticipated Procedures

1. Faculty of Agriculture, Forestry & Veterinary Science, Univ. of Dar es Salaam, P.O. Box 642, Morogoro, Tanzania
2. Washington State University, Irrigated Agric. Res. & Ext. Center, P.O. Box 30, Prosser, WA 99350 USA
3. Dept. of Agric. Economics, Univ. of Illinois, Urbana, IL 61801 USA

B. Proposed research methodology in brief:

1. Collect germplasm from domestic and foreign bean workers.
2. Define seed and plant characters as well as maturity and yield parameters under field conditions.
3. Rate the disease and insect damages on 0-10 scale and assess economic impact of losses.

Country Tanzania

4. Collect isolates of major pathogens from different locations, varieties, and cropping seasons. Test the same for race/strain variation on differential test varieties.
5. Identify horizontal and vertical sources of resistance using pathotypes identified.
6. Develop back-cross breeding program to maintain horizontal factors, incorporate vertical factors for resistance using pathotypes identified.
7. Test the crop protection effectiveness and economic impact of mixed cropping and multilines against selected diseases and insects.
8. Estimate economic viability of new varieties in mixed cropping systems for small farmers.

C. Approximate time schedule over first year:

1. Collection of germplasm - 2 months.
2. Record preliminary data on agronomic characteristics, disease and insect resistance and economic assessment of losses - 5 months.
3. Isolation of pathogens from germplasm evaluation trails, and testing of parental lines to identify vertical and/or horizontal resistance - 5 months.
4. Estimate economic viability of popular varieties - 1 month.
5. Survey of intercropping system - 5-6 months.

D. Division of labor:

1. Anticipated responsibilities of host country researchers:
 - a. Collect, evaluate, and maintain germplasm.
 - b. Identify parental material and develop hybridization program.
 - c. Document crop losses and estimate economic value.
 - d. Establish bean yield protection value (from selected disease and insects) of mixed crops and multilines.
 - e. Assist in data collection re C4 and C5 above and in data analysis and reporting.
2. Anticipated responsibilities of U.S. researchers:
 - a. Help plan research proposal.
 - b. Identify strains of Bean Common Mosaic Virus and halo blight, and develop screening and breeding techniques for same (Silbernagel).
 - c. Plan form of data collection re economic assessments and intercropping system (Due).
 - d. Assist in computerization and analysis and report writing (Due).
 - e. Supervise questionnaire design, implementation, and analysis (Due).

174

Country Tanzania

IV. Training Component (indicate number, levels and sites)

Estimate: 1 Ph.D. Ag. Economics, University of Illinois each year
1 Ph.D. Crop Science each year

175

Country Tanzania

V. Estimated Budget for First Year

	No.	Time % on CZSP	Proposed Budget Estimate			
			Contrib. from US Instituc.	Contrib. from Host Instituc.	Requested from Title XII Expended in US	Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.			\$	\$	\$	\$
b. Co-investigators			\$	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students			\$	\$	\$	\$ 5,000
d. Pre-Baccalaureate Students			\$	\$	\$	\$ 1,000
e. Secretarial-Clerical			\$	\$	\$	\$ 2,000
f. Technicians			\$	\$	\$	\$ 5,200
TOTAL SALARIES AND WAGES						
			\$	\$	\$	\$ 3,300
B. Fringe Benefits (if charged as Direct Costs						
C. Total Salaries, Wages, and Fringe Benefits (A + B)						
			\$	\$	\$	\$ 16,500
D. Equipment						
			\$	\$	\$	\$ 40,000
E. Materials and Supplies						
			\$	\$	\$	\$ 20,000
F. Travel--1. Domestic (Including Canada, U.S.)						
2. Foreign						
			\$	\$	\$	\$ 6,000
3. Accompanying Dependents (for long-term assignments)						
			\$	\$	\$	\$
G. Shipment and Storage of Household Goods						
			\$	\$	\$	\$
H. Housing Allowances						
			\$	\$	\$	\$
I. Orientation and Medical Expenses						
			\$	\$	\$	\$
J. Publication Costs/Page Charges						
			\$	\$	\$	\$ 1,500
K. Computer Costs						
			\$	\$	\$	\$ 1,500
L. All Other Direct Costs						
			\$	\$	\$	\$
M. Training Costs						
			\$	\$	\$	\$
N. Total Direct Costs (C through M)						
			\$	\$	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
			\$	\$	\$	\$
Total Indirect Costs						
			\$	\$	\$	\$ 90,000
P. Total Direct and Indirect Costs (N plus O)						

PERSONS PREPARING THIS DOCUMENT:

	Name
Host Country:	Dr. B. J. Ndunguru
U.S.	Dr. H. J. Silbernagel
	Dr. J. M. Due

Title and Address

Head, Dept. Crop Sci, Faculty of Agric., Forestry & Vet. Sci., Univ. of Dar es Salaam, P.O. Box 643, Morogoro, Tanzania
see attachment
see attachment

B/C PLANNING OFFICE REPRESENTATIVE Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

1715

Country Tanzania
Urbana--Univ. of Illinois

V. Estimated Budget for First Year

	Time % on CRSP	Proposed Budget Estimate			
		Contrib. from US Instituc. U of Ill Urbana	Contrib. from Host Instituc.	Requested from Title XII	
				Expended in US U of Ill Urbana	*Expended in/for Host Country
A. Salaries and Wages					
1. Senior Personnel					
a. P.I.	1	24	\$ 9,576	\$	\$
b. Co-investigators			\$	\$	\$
2. Other Personnel (Non-Faculty)					
a. Research Associates-Postdoc			\$	\$	\$
b. Other Professionals			\$	\$	\$
c. Graduate Students			\$	\$ 5,000	\$
d. Pre-Baccalaureate Students			\$	\$	\$
e. Secretarial-Clerical	2	11/8.3	\$ 1,325	\$ 1,000	\$
f. Technicians			\$	\$	\$
TOTAL SALARIES AND WAGES			10,901	6,000	
B. Fringe Benefits (if charged as Direct Costs)			1,761	959	
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 12,662	\$ 6,959	\$
D. Equipment			\$	\$	\$
E. Materials and Supplies			\$	\$	\$
F. Travel--1. Domestic (Including Canada, U.S.)					
2. Foreign				6,500	
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$
G. Shipment and Storage of Household Goods			\$	\$	\$
H. Housing Allowances			\$	\$	\$
I. Orientation and Medical Expenses			\$	\$	\$
J. Publication Costs/Page Charges			\$	\$ 500	\$
K. Computer Costs			\$	\$ 1,000	\$
L. All Other Direct Costs			\$	\$ 951	\$
M. Training Costs			\$	\$	\$
N. Total Direct Costs (C through M)			\$	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)					
Total Indirect Costs 68% of salaries			\$ 7,413	\$ 4,080	\$
P. Total Direct and Indirect Costs (N plus O)			\$ 20,075	\$ 20,000	\$

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:		
U.S.	Dr. Jean M. Due (Dr. M. J. Silbernagel)	Professor, Dept. Agric. Econ., Univ. of Illinois 305 Monford Hall, Urbana, IL 61801

3/C PLANNING OFFICE REPRESENTATIVE Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

Country Tanzania
 Prosser -- WSU

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Instituc. WSU USDA Prosser	Contrib. from Host Instituc.	Requested from Title XII	
					Expanded in US WSU USDA Prosser	Expanded in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	15	\$ 5,300	\$	\$	\$
b. Co-investigators			\$	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students			\$	\$	\$	\$
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical	1	10	\$ 1,100	\$	\$	\$
f. Technicians	2	10/75	\$ 1,671	\$	\$ 7,500	\$
TOTAL SALARIES AND WAGES			8,071		7,500	
B. Fringe Benefits (if charged as Direct Costs)			10/8%	907	\$ 600	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 8,978	\$	\$ 9,100	\$
D. Equipment, facilities, & land use			\$ 11,122	\$	\$	\$
E. Materials and Supplies			\$ 5,000	\$	\$ 3,200	\$
F. Travel--1. Domestic (Including Canada, U.S.)					600	
2. Foreign					4,500	
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$	\$
I. Operation and Medical Expenses			\$	\$	\$ 748	\$
J. Publication Costs/Page Charges			\$	\$	\$ 600	\$
K. Computer Costs			\$	\$	\$ 500	\$
L. All Other Direct Costs			\$	\$	\$	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$	\$	\$ 10,248	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs 37% WSU			\$	\$	\$ 6,752	\$
P. Total Direct and Indirect Costs (N plus O)			\$ 25,000	\$	\$ 25,000	\$

PERSONS PREPARING

THIS DOCUMENT:

Name

Title and Address

Host Country:

U.S.

Dr. M. J. Silbernagel

Res. Plant Pathologist, USDA-SEA/PR, WCL-
IAREC, P. O. Box 30, Prosser, WA 99350

B/C PLANNING OFFICE REPRESENTATIVE Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

(Abstract)

MALAWI (Bunda College)

Bunda College of Agriculture, Research team headed
by Dr. O.T. Edje

Michigan State University
Drs. M.W. Adams, P. Barnes-McConnell

Virginia State University

TOPIC: Contribution of culture, physical environment, farm practices, local utilization preferences, and plant population biology in the evolution and maintenance of bean land races.

Preferred (by Malawi) Research Items:

1. Establish plant and cultural characteristics essential to acceptance by subsistence farmers.
 2. Identify the biological, physical and cultural forces accounting for present patterns of diversity.
 3. Determine the role of women in production of beans, seed selection, and group acceptance of particular types for specific uses.
 4. Determine the desire for and the definition of "improved" cultivars in a complex rural-village social system.
 5. Derive principles to serve as guidelines to the successful introduction and acceptance of an "improved" cultivar.
- 179

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

DOMINICAN REPUBLIC

I. Proposed Research

- A. Topic: Biology, Epidemiology and development and distribution of multiple disease resistant bean seed in the Dominican Republic (Nebraska Contribution)
- B. Constraint Area(s) to be Addressed
Rust and bacterial blight diseases along with other diseases cause low and variable productivity (600-800 ky/ha) of beans
- C. Description of Proposed Research (production and non-production)
Research will be orientated towards obtaining the necessary data on epidemiology of bean diseases (rust, bacterial blight) that will enable control strategies to be developed for the small farmer. Determine which bacterial blights are important. Screen germplasm (P. vulgaris and other P. germplasm) for resistance to the involved pathogens. Place emphasis on high tolerance/horizontal types of resistance rather than race specific. Determine the inheritance of components of resistance and seek to recombine different components. Transfer resistance into seed and plant types required in the Dominican Republic and also combine resistance identified by us with resistance to other pathogens (web blight, virus, root rots, and angular leaf spot) identified by researchers in Puerto Rico. Transmission of bacteria in seed of tolerant lines will be investigated to select for lower transmission.
- D. Anticipated Long-range research goal(s)
To develop disease resistant varieties in order to increase productivity of small bean acreages.
- E. First Year Objective(s)
(1) Organize the project (identify and contact personnel; plan and develop training program for students to come to UNI)
(2) Identify bean diseases and initiate germplasm testing for resistance
(3) Make crosses of resistant germplasm with bean types desired in Dominican Republic.
Items (1) and (2) are the same as listed in the Puerto Rico request.
- F. Type of Professional Personnel Required
Dominican Republic: Plant Pathologist, Plant Breeder, Sociologist.
University of Nebraska: Plant Breeder (1) Plant Pathologist (2) - a second plant breeder will spend some time on the project.

Country Dominican Republic

II. Potential Collaborators

Host Country - P.I.:	P. Comala (BS)	Plant Breeding	SEA
Co-Investigators:	to be identified	Plant Pathology	
U.S. - P.I.:	Dr. D.P. Coyne	Plant Breeder	Dept. Hort. UN-L. Nebr.
	Dr. M.L. Schuster	Plant Pathologist	" "
	Dr. J.R. Steadman	Plant Pathologist	Dept. Plant Path. UN-L. Nebr.
	Dr. Dale Lindgren	Plant Breeder	North Platte Expt. Stat. Univ. Nebr. North Platt

III. Anticipated Procedures

A. Proposed research site(s):

- (1) Dominican Republic (Southwest/North/Central/Regional Agricultural Directorates (SEA)
- (2) USA (UN-L, UPR-Mayaguez, Isabela, Adjuntas, Fortuna, and MSU)

B. Proposed research methodology in brief:

- (1) Bacterial pathogens causing bean diseases will be identified and characterized.
- (2) Mode of survival will be investigated.
- (3) Epidemiological studies determining mode of disease dissemination and environmental parameters promoting disease will be initiated.
- (4) Germplasm will be screened for resistance to rust and the bacterial pathogens in the field in the Dominican Republic and in controlled tests in Nebraska.
- (5) Emphasis will be placed on identifying horizontal resistance in order to obtain more durable resistance.
- (6) The components of horizontal resistance will be investigated.
- (7) The inheritance of resistance to pathogens will be determined by graduate students using both interspecific and intraspecific crosses.
- (8) Resistance will be transferred to desired seed types adapted to the Dominican Republic.
- (9) A disease-free program will be incorporated into the breeding program. Effort will be made to select bean genotypes with reduced transmission of the pathogens.

Country Dominican Republic

C. Approximate time schedule over first year:

- (1) Making contact with personnel in Dominican Republic and Puerto Rico - (first month)
- (2) Disease and site identification - (first month)
- (3) Determination of students for UN-L training - 6 months
- (4) Epidemiology Studies - 6 months
- (5) Isolation and characterization of bacterial pathogens - 6 months
- (6) Screening resistant germplasm - all of first year
- (7) Start hybridization - 6-12 months

D. Division of labor:

1. Anticipated responsibilities of host country researchers:
 1. Setup and maintain field plots to screen for resistance.
 2. Help in evaluating reactions of germplasm in field plots.
 3. Identify researchers for UN-L training (MS, Ph.D.)
2. Anticipated responsibilities of U.S. researchers:
 1. Train graduate students (MS, Ph.D.)
 2. On site determination of diseases and research sites
 3. Advise on and conduct epidemiology studies and appropriate control strategies
 4. Isolate and identify causal bacteria of diseases, determine variability, determine sources of primary inoculum
 5. Screen germplasm for resistance, conduct genetic analysis of resistance and incorporate resistance into desired bean types in cooperation with researchers from Puerto Rico who will work with other pathogens

IV. Training Component (indicate number, levels and sites)

- (1) Two graduate students (Ph.D. level) - breeding and genetics of resistance to bacteria and rust pathogens
- (2) One graduate student - epidemiology and characterization of bacteria (Ph.D. level). These graduate students would conduct their academic programs at the University of Nebraska, Lincoln Campus, NE and could conduct their research program in the Dominican Republic (or part of research at Lincoln)

182

Country Dominican Republic

V. Estimated Budget for First Year

NOTE: \$45,000 included in the budget submitted by Puerto Rico was for cooperative research Proposed Budget Estimate with Univ.

	No.	Time % on CRSP	Proposed Budget Estimate with Univ.			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title III Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	20	\$ 6,800	\$	\$	\$
b. Co-investigators	2	20	\$ 11,800	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	1	10	\$ 2,100	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students	3	100	\$	\$	\$	\$ 21,000
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical	1	20	\$	\$	\$ 2,000	\$
f. Technicians	1	50	\$	\$	\$ 6,500	\$
TOTAL SALARIES AND WAGES			20,700			21,000
B. Fringe Benefits (if charged as Direct Costs)			\$ 2,691	\$	\$ 1,101	\$ 1,470
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 23,391	\$	\$ 9,605	\$ 22,470
D. Equipment			\$	\$	\$	\$
E. Materials and Supplies			\$	\$	\$ 2,000	\$ 2,000
F. Travel--1. Domestic (Including Canada, U.S.)						
2. Foreign						
J. Accompanying Dependents (for long-term assignments)			\$	\$	\$ 1,700	\$ 8,900
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$	\$
I. Orientation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Paper Charges			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$ 300	\$
L. All Other Direct Costs			\$	\$	\$	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$ 23,391	\$	\$ 13,905	\$ 33,370
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			\$	\$	\$ 8,107	\$ 19,455
P. Total Direct and Indirect Costs (N plus O)			\$ 23,391	\$	\$ 22,012	\$ 52,825

PERSONS PREPARING THIS DOCUMENT:

Host Country: Agro. Guillermo Contreras
Agro. Raul Pineda
Dr. Antonio Pinchinat
 U.S.: Dr. J. Montaya
D.P. Coyne
M.L. Schuster
J.R. Steadman

GRAND TOTAL AMOUNT = \$98,228
 Title and Address

SEA. St. Domingo, D.R.
SEA. St. Domingo, D.R.
IICA St. Domingo, D.R.
Professor, Dept. Hort., Univ. of Nebraska
Professor, Dept. Hort., Univ. of Nebraska
Professor, Dept. Hort., Univ. of Nebraska
Professor, Dept. Plant Pathology, UNL

B/C PLANNING OFFICE REPRESENTATIVE

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

DOMINICAN REPUBLIC

I. Proposed Research

A. Topic:

Development and distribution of multiple disease resistant bean seed in the Dominican Republic.

B. Constraint Area(s) to be Addressed:

1. Low and variable productivity (600-800 kg/ha) due to diseases (rust, root rots, bacterial blights, viruses, angular leaf spot, anthracnose, web-blight).
2. Production systems (lack of technical information, low capital to acquire technological inputs, plant architecture adjusted to specific cropping systems, production economics, and functions).
3. Production and distribution of high quality basic seed (infrastructure, laboratory equipment and techniques, linkages between research and extension).

C. Description of Proposed Research (Production and Non-Production):

The project will assemble a research staff and support personnel with the capability of investigating the role diseases play in the various farming systems in the principal production areas. Available sources of resistance will be introduced and tested in the Dominican Republic to determine their applicability to stabilize and increase bean yields. Appropriate sources of resistance will be introduced into the breeding program to transfer such resistance to preferred standard Dominican bean types. Breeding for improved multiple disease resistance will be continued at the University of Puerto Rico and MITA. The University of Nebraska will collaborate in investigating sources of resistance from other Phaseolus species germ plasm. A complementary program will be developed to determine the seed-transmitted pathogens' role in reducing bean yields in the present farming systems. Clean seed of preferred standard varieties and new improved disease resistant cultivars will be entered into the first stage of a seed multiplication and distribution program to provide a source of basic seed.

D. Anticipated Long-Range Research Goal(s):

1. Increase and stabilize yield and production of preferred bean cultivars.
2. Establish and sustain in-country technical and research capability to accomplish the objectives of the project.

E. First Year Objective(s):

1. Organize the project (identify and contract personnel; plan and develop training program).
2. Study (diagnose) farming systems.

181

3. Identify bean diseases and initiate germ plasm testing for resistance.
4. Evaluate (drill box survey) quality of seed used by farmers.
5. Organize and set-up seed laboratory and analyses systems.
6. Organize basic seed production scheme.

F. Type of Professional Personnel Required:

1. Dominican Republic

- 1.1. Project co-investigator (plant breeder)
- 1.2. Phytopathologist
- 1.3. Agricultural economist (farm management)
- 1.4. Seed technologist
- 1.5. Cropping systems specialist (zoning and soils)
- 1.6. Sociologist (consultant)

2. Univ. of Puerto Rico, Michigan State Univ. and Univ. of Nebraska

- 2.1. Phytopathologist/Disease resistance
- 2.2. Phytopathologist/Seed quality
- 2.3. Plant breeder/Disease resistance
- 2.4. Agronomist/General
- 2.5. Phytopathologist/Laboratory and Greenhouse
- 2.6. Plant breeder/Pathologist (bacterial blight)
- 2.7. Phytophysiologist (consultant)

II. Potential Collaborators

		<u>Researcher</u>	<u>Discipline</u>	<u>Prof. Address</u>
1. Dom. Rep.	P.I.: Co-Investigators:	1.1. P. Comala, B.S.	Plant Breeding	SEA
		1.2. _____, M.S.	Phytopathology	
		1.3. _____, M.S.	Ag. Economics	
		1.4. A. Núñez, M.S.	Seed Technology	
		1.5. R. Boris, M.S.	Crop Systems/Agron.	
		1.6. _____, Ph.D.	Sociology (consult.)	
		1.7. _____, Ph.D.	Physiology (consult.)	
2. U.S.		2.1. J.H. López-Rosa, Ph.D.	Phytopathology	UPR
		2.2. A.F. Saettler, Ph.D.	Phytopathology	MSU
		2.3. G.F. Freytag, Ph.D.	Breeding	MITA
		2.4. R. Echávez, M.S.	Agronomy	UPR
		2.5. M. Zapata, B.S.	Phytopathology	UPR
		2.6. D. Coyne, Ph.D.	Breeding	UN

III. Anticipated Procedures

A. Proposed Research Site(s):

1. Dominican Republic (Southwest/North/Central/Regional Agricultural Directorates (SEA).
2. US (UPR-Mayaguez, Isabela, Adjuntas, Fortuna; MSU; UN).

B. Proposed Research Methodology in Brief:

1. Screen, identify and breed for multiple disease resistance in Puerto Rico.
2. Survey socio-economic factors of the principal farming systems of the major Dominican bean production areas.
3. Evaluate multiple disease resistant sources in the principal farming systems in the Dominican Republic.
4. Breed by backcross multiple disease resistance into preferred Dominican cultivars.
5. Select progenies in the Dominican Republic.
6. Increase, select for uniformity and yield test in multiple locations.
7. Perform combined analysis of data to guide the breeding program.
8. Survey available seed in major production areas for seed-borne pathogens and quality.
9. Determine limiting factors for quality seed production and develop a program to solve such problems.
10. Provide and release seed of improved bean cultivars.

C. Approximate Time Schedule Over First Year:

- | | |
|----------------------------------|------------------|
| 1. Planning | January-March |
| 2. Staffing and procurement | January-April |
| 3. Training | March-December |
| 4. Evaluation of farming systems | April-December |
| 5. Testing | May-December |
| 6. Breeding and screening | January-December |

D. Division of Labor:

1. Anticipated responsibilities of Dominican Republic researchers:

- 1.1. Participate in planning and programming of research activities.
- 1.2. Conduct and supervise research activities.
- 1.3. Jointly evaluate research results.
- 1.4. Transfer research results.
- 1.5. Plan and participate in training programs.

2. Anticipated responsibilities of U.S. researchers:

- 2.1. Joint planning and programming of research activities.
- 2.2. Conduct and guide research activities.
- 2.3. Provide training in needed areas.
- 2.4. Jointly evaluate research results.

IV. Training Component (Number, Levels and Sites):

1. Continuing diagnosis of training needs.

<u>2.</u>	<u>Discipline</u>	<u>Number</u>	<u>Level</u>	<u>Site</u>
2.1.	Breeding	2-3	MS/PhD	UPR, MSU, UN
2.2.	Seed Technology	1	MS	Cornell, Miss.
2.3.	Phytopathology	2	MS/PhD	UPR, MSU, UN, Cornell, Calif.
2.4.	Ag. Economics (Production)	1	PhD	MSU, Texas A&M
2.5.	Farming Systems	1	MS	Cornell, Florida
3.	In-country training (non-degree)			
3.1.	Socio-economic survey	3		DR, UPR
3.2.	Field management	12		DR, UPR
4.	Specialized in-service post-graduate training (non-degree)			
4.1.	Breeding) According to needs		
4.2.	Phytopathology			
4.3.	Physiology			
4.4.	Biometry			

Country Dominican Republic

V. Estimated Budget for First Year

	No.	Time % on CRSP person years	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII	
					Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	.50	\$	\$	\$ 14,100	\$
b. Co-investigators	2	1.20	\$	\$	\$ (6,000) ^a	\$ 18,300
2. Other Personnel (Non-Faculty)						
a. Research Associates-PostDoc			\$	\$	\$ -0-	\$ -0-
b. Other Professionals	7	6.08	\$	\$	\$ 22,800	\$ 47,700
c. Graduate Students	3	3.00	\$	\$	\$	\$ 15,000
d. Laborers	8	8.00	\$	\$	\$ 10,000	\$ 7,000
e. Secretarial-Clerical	3	3.00	\$	\$	\$ 7,560	\$ 9,500
f. Technicians	7	7.00	\$	\$	\$ 15,000	\$ 15,000
TOTAL SALARIES AND WAGES					69,460	112,200
B. Fringe Benefits (if charged as Direct Costs)			\$	\$	\$ 10,410	\$
C. Total Salaries, Wages, and Fringe Benefit. (A + B)			\$	\$	\$ 79,870	\$
D. Equipment			\$	\$	\$ 2,000	\$ 26,000
E. Materials and Supplies			\$	\$	\$ 2,000	\$ 10,000
F. Travel--1. Domestic (Including Canada, U.S.)					1,600	6,000
2. Foreign					400	6,000
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$ -0-	\$ -0-
G. Shipment and Storage of Household Goods			\$	\$	\$ -0-	\$ -0-
H. Housing Allowances			\$	\$	\$ -0-	\$ -0-
I. Orientation and Medical Expenses			\$	\$	\$ -0-	\$ -0-
J. Publication Costs/Page Charges			\$	\$	\$ 1,000	\$ 2,000
K. Computer Costs			\$	\$	\$ 2,000	\$ -0-
L. All Other Direct Costs (Equip. + Repairs, Communications, etc.)			\$	\$	\$ 2,000	\$ 4,000
M. Training Costs			\$	\$	\$ 500	\$ 3,000
N. Total Direct Costs (C through M)			\$	\$	\$ 91,370	\$ 152,200
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)					20,982 ^c	
Total Indirect Costs (at 60% of 69,460 on campus rate for work in P.R.)			\$	\$	\$ 41,676	\$ 15,708 ^b
P. Total Direct and Indirect Costs (N plus O)			\$	\$	\$ 91,370	\$ 184,208

PERSONS PREPARING

THIS DOCUMENT:

Name

Title and Address

Host Country: Agro. Guillermo Contreras
Agro. Raul Piriada
Dr. Antonio Pinchinat
Dr. Horacio Stagno
 U.S. Dr. Jorge Montoya
Dr. George Freytag
Dr. Julio H. Lopez-Rosa

SEA, Sta. Domingo, D.R.
SEA, Sta. Domingo, D.R.
IICA, " " "
IICA, " " "
IICA, " " "
MITA, Mayaguez, P.R.
UPR, Mayaguez Campus, P.R.

B/C PLANNING OFFICE REPRESENTATIVE Drs. Freytag and Lopez-Rosa (designates)

* Includes foreign travel and training for host country nationals in the U.S.
 a. Contributed by U.S. Dept. of Agriculture at no charge to project. b. Indirect cost @ 14% of 112,200. c. Off-campus G & A rate of 20% x 104,908.

152

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

HONDURAS

I. Proposed Research

A. Topic: Increase and stabilization of Honduran bean production through disease resistance

B. Constraint Area(s) to be Addressed

Low and variable bean productivity due, in part, to diseases

C. Description of Proposed Research (production and non-production)

The project will assemble a research staff and support personnel with the capability of investigating the role diseases play in the various farming systems in the principal Honduran bean production areas. Available sources of resistance will be introduced and tested in Honduras to determine their applicability to stabilize and increase bean yields. Appropriate sources of resistance will be introduced into the breeding program to transfer such resistance to preferred standard Honduran bean types. Breeding for improved multiple disease resistance will be continued in Puerto Rico and incorporated into the Honduran effort at the Escuela Agricola Panamericana. The project will provide a basic seed stock of improved preferred standard Honduran bean cultivars for multiplication and distribution.

D. Anticipated Long-range research goal(s)

Increase and maintain stable production of preferred Honduran bean cultivars

E. First Year Objective(s)

- (1) Study farming systems for the preferred Honduran bean types in the major production areas.
- (2) Evaluate available multiple disease resistant germ plasm under Honduran conditions.
- (3) Initiate transfer of multiple disease resistance to preferred Honduran bean cultivars.

F. Type of Professional Personnel Required

Economist-sociologist, pathologists, agronomists, breeders

Country Honduras

II. Potential Collaborators

	Researchers	Discipline	Professional Address
Host Country - P.I.:	P.E. Paz	Breeder	EAP
Co-Investigators:	M. Contreras	Phytopathologist	SRN
	L.O. Tercero	Agronomist	SRN
U.S. - P.I.:	J.H. Lopez-Rosa	Phytopathologist	AES-UPR
	G.F. Freytag	Breeder	MITA
	Mildred Zapata	Phytopathologist	AES-UPR
	R. Echavez	Agronomist	AES-UPR

III. Anticipated Procedures

A. Proposed research site(s):

- a. Puerto Rico - 4 locations
 - b. Honduras
 - (a) Zamorano (EAP)
 - (b) Danli (El Paraiso)
 - (c) Catacamas (Olancho)
 - (d) Valle de Siria
- Three farming types in each of these localities.

B. Proposed research methodology in brief:

1. Screen, identify and breed for multiple disease resistance in Puerto Rico.
2. Evaluate multiple disease resistant advanced bean lines in the principal farming systems in the major Honduran bean areas.
3. Transfer multiple disease resistance from Puerto Rico advanced lines into preferred Honduran cultivars.
4. Evaluate and select progenies in Honduras and Puerto Rico.
5. Increase and select for uniformity, and yield test in multiple locations.
6. Perform combined analysis of data to guide breeding effort to accomplish project's goals.
7. Provide a basic seed stock of improved preferred Honduran bean cultivars for multiplication and distribution.

C. Approximate time schedule over first year:

1. Continuous breeding in Puerto Rico for higher levels of multiple disease resistance - Jan.-Dec.
2. Organization of program. Training. Contacts with various type of farmers. Survey of practices and cropping systems - Jan.-May.
3. Evaluation in Honduras of multiple disease resistance in two planting seasons - June-Dec.
4. Selection of donor germ plasm for conversion of Honduran cultivars Nov.-Dec.

Country Honduras

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:
 - (a) Participate in planning of project and in evaluation of research results.
 - (b) Coordinate and supervise research activities.
 - (c) Establish an agronomist in each locality in Honduras.
 - (d) Carry out field research activities.
 - (e) Breed and evaluate profenies for conversion program.
 - (f) Increase released materials for distribution.

2. Anticipated responsibilities of U.S. researchers:
 - (a) Carry out planning of project and evaluate research results.
 - (b) Provide training in specialized areas.
 - (c) Breed and provide basic multiple disease resistant germ plasm.
 - (d) Participate in testing selected materials.
 - (e) Global evaluation of results and preparation of reports.

IV. Training Component (indicate number, levels and sites)

- A. Graduate training, at the MS/PhD level, in U.S. universities for two Honduran nationals, one in phytopathology and one in breeding.
- B. In-service training (field plot technique, pathology, breeding) in Honduras & Puerto Rico for four Honduran agronomists.
- C. Specialized in-service, post-graduate (non-degree) training for Project staff as needed.

Country Honduras

V. Estimated Budget for First Year

	No.	Time % on CRSP person years	Proposed Budget Estimate			
			Contrib. from US Instituc.	Contrib. from Host Instituc.	Requested from Title XII Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	0.25	\$	\$	\$ 7,050	\$
b. Co-investigators	3	0.40	\$	\$	\$(6,000) ^a	\$ 10,000
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$ -0-	\$ -0-
b. Other Professionals	4	1.25	\$	\$	\$ 11,400	\$ 2,340
c. Graduate Students			\$	\$	\$ -0-	\$ -0-
d. Laborers	4	4.00	\$	\$	\$ 10,000	\$ 4,000
e. Secretarial-Clerical	2	2.00	\$	\$	\$ 7,560	\$ 2,000
f. Technicians	5	5.00	\$	\$	\$ 10,000	\$ 18,000
TOTAL SALARIES AND WAGES					46,010	36,240
B. Fringe Benefits (if charged as Direct Costs)			15%	\$	\$ 6,901	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$	\$	\$ 52,911	\$
D. Equipment			\$	\$	\$ 1,000	\$ 1,000
E. Materials and Supplies			\$	\$	\$ 1,000	\$ 1,000
F. Travel--1. Domestic (Including Canada, U.S.)					1,700	
2. Foreign					1,000	9,000
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$ -0-	\$ -0-
G. Shipment and Storage of Household Goods			\$	\$	\$ -0-	\$ -0-
H. Housing Allowances			\$	\$	\$ -0-	\$ -0-
I. Orientation and Medical Expenses			\$	\$	\$ -0-	\$ -0-
J. Publication Costs/Page Charges			\$	\$	\$ 1,000	\$ 1,000
K. Computer Costs			\$	\$	\$ 2,000	\$ -0-
L. All Other Direct Costs (equip., communications, etc.)			\$	\$	\$ 1,000	\$ 2,000
M. Training Costs			\$	\$	\$ 500	\$ 500
N. Total Direct Costs (C through M)			\$	\$	\$ 62,111	\$ 5,074
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)					11,598 ^d	
Total Indirect Costs (at 50% of \$52,911 on campus (at 50% of \$5,074 off campus))			\$	\$	\$ 31,746	\$ 7,248 ^c
P. Total Direct and Indirect Costs (N plus O)			\$	\$	\$ 93,857	\$ 12,322

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	Dr. Simon Malo	Director, E.A.P., Tegucigalpa
	Dr. Pablo E. Paz	Director, Plan Sciences, E.A.P., Tegucigalpa
U.S.	Dr. George F. Freytag	MITA, Mayaguez, Puerto Rico
	Dr. Julia Lopez-Rosa	IIPR, Mayaguez Campus, Puerto Rico
B/C PLANNING OFFICE REPRESENTATIVE		

* Includes foreign travel and training for host country nationals in the U.S.
a) contributed by U.S. Dept. of Agriculture at no charge to project. b) land rental and preparation. c) indirect cost at 20% of \$36,240. d) off-campus G & A @ 20% of \$57,990.

192

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

INCAP (Guatemala)

Proposed Research

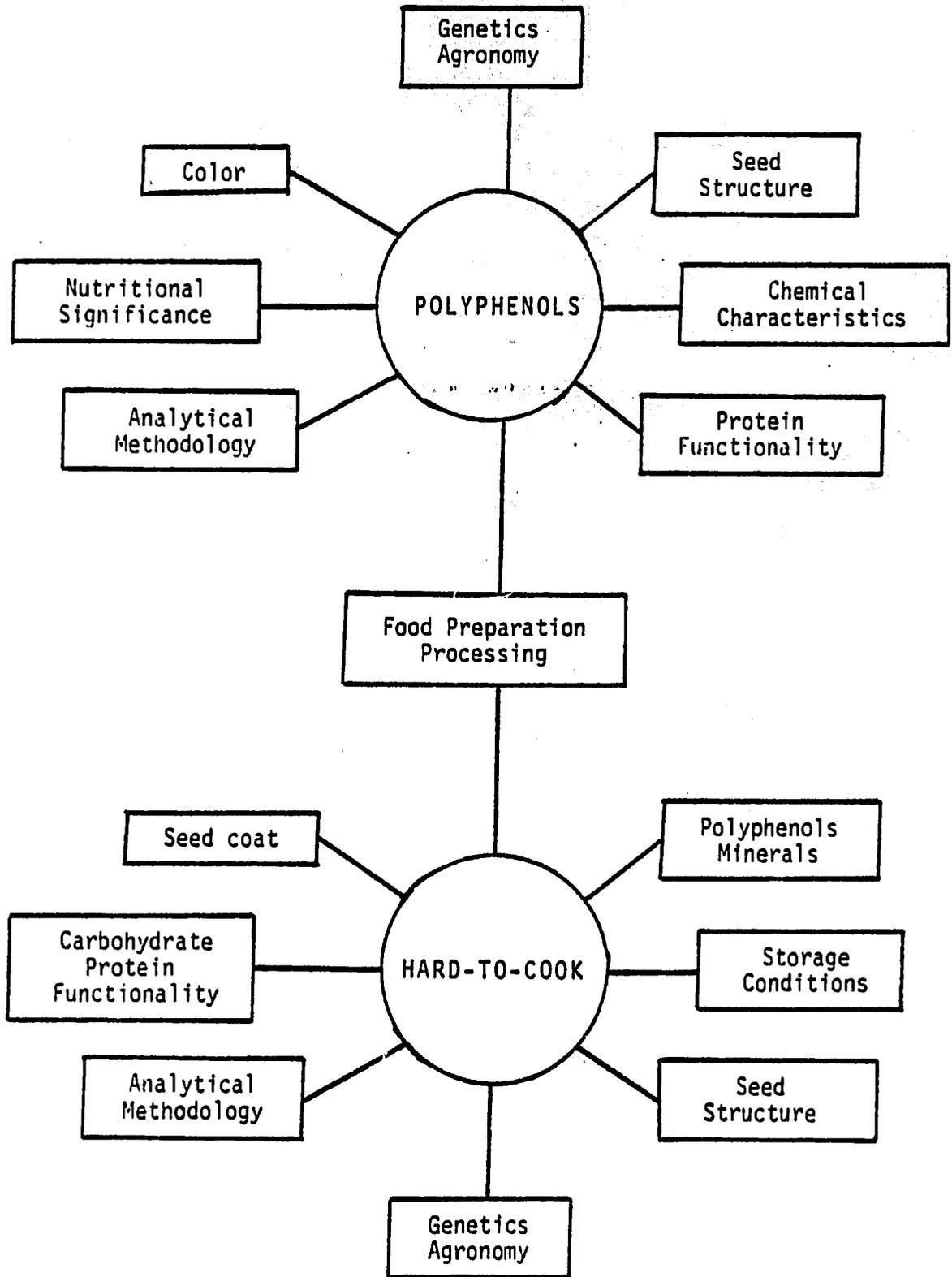
A. Topic: Improved biological utilization and availability of dry beans.

B. Constraint area(s) to be addressed: Nutrition, Food Preparation & Health;
Storage and Commodity Maintenance.

C. Description of proposed research: The proposed research is primarily directed to the question of the effect of polyphenols, and other anti-nutritional factors, on bean protein digestibility; however, other factors that constrain the availability and consumption of dry beans, such as storage and consumer acceptance will also be appraised. The proposed research areas comprise the development of analytical methodology for the characterization of polyphenols in beans and biological materials, the determination of the role of polyphenols and minerals on the development of the hard-to-cook phenomenon, the biodeterioration, the functional properties of beans and the acceptability and the assessment of the nutritional significance of the types of polyphenols on bean protein quality and digestibility in animals and human beings. All the studies will be carried out using beans of different colors and preparation techniques.

The research endeavors will establish genetic and technological alternatives for the improvement of the nutritional and storage quality of beans, as well as suggesting alternatives for the utilization of hard-to-cook beans.

D. Anticipated long-range research goals: Improved utilization and availability of beans for human consumption through genetic, nutritional and technological



1994

interventions.

E. First year objective(s):

1. To develop analytical methodology for the characterization of polyphenols of dry beans of different colors.
2. To determine the role of total and relative divalent, sodium and potassium ions concentration in beans of different colors on the development of the hard-to-cook phenomenon and the physical-chemical changes in the protein and carbohydrates during storage.
3. To study the effect of seed coat color on the digestibility of bean protein "in vitro" and "in vivo" using animals and human beings.

F. Type of Professional Personnel Required:

Technicians, Graduate and Undergraduate University Students.

II. Potential Collaborators:

	Researchers	Disciplines	Professional Address
Host Country - P.I.	R. Bressani	Biochem-Nutr.	INCAP, Guate
Co-Investigators:	E. Braham	Biochem-An Nutr	INCAP, Guate
	L. G. Elias	Food Sci-Nutr.	INCAP, Guate
	M. Molina	Food Sci-Nutr.	INCAP, Guate
	R. Gomes Brenes	Biochem-Nutr.	INCAP, Guate
United States - P.I.	B. G. Swanson	Food Sci-Nutr.	INCAP, Guate
Co-Investigators:	E. Varriano-Marsten	Food Sci	Kansas State Univ.
	D. R. Wood	Agron-Gen	Colorado St Univ.
	G. Hosfield	Food Sci-Agron	Michigan St. Univ.
	G. Freitag	Agron-Gen	USDA, Puerto Rico
	J. Lopez-Rosa	Agron-Gen	Univ. Puerto Rico

III. Anticipated procedures

A. Proposed research site(s):

Institute of Nutrition of Central America and Panama (INCAP),

Guatemala, Guatemala, C. A.

Washington State University

Pullman, WA. 99164

Kansas State University

Manhattan, KS.

Colorado State University

Fort Collins, CO.

Michigan State University

East Lansing, MI. 48824

University of Puerto Rico

Rio Piedras, Puerto Rico 00928

B. Proposed research methodology in brief:

Objective 1. Assay of polyphenols with paper, thin layer (TLC), column, gas-liquid (GLC) and high performance liquid (HPLC) chromatography and electrophoresis.

Objective 2. Mineral analysis by atomic absorption, bean hardness determination by puncture tests, physico-chemical characterization of starch and protein fractions by viscosity, absorption, desorption, solubility pattern, electronic microscopy, degree of gelatinization, gelatinization curves and bound minerals.

Objective 3. Protein quality of beans. Chemical: nitrogen and amino acid analysis. Biological: in animals, through nitrogen efficiency ratio (NER) and digestibility determinations; in humans, by the Nitrogen Balance Index Method; and in vitro, protein digestibility by the enzymatic method on bean cultivars selected for specific characteristics such as high poly-

196

phenolic or high protein concentration.

C. Approximate time schedule over first year:

Objective 1. Evaluation of chromatography (paper, TLC, and column) (3 months).

Electrophoresis (paper, TLE and gel) (3 months).

Combined methodologies (5 months).

Selected methodology in different varieties of beans (1 month).

Objective 2.

a. Collection, analysis and preparation of samples (3 months).

b. Storage under controlled temperature and relative humidity conditions and different dry bean moisture concentrations. (6 months).

c. Analysis of the samples at different storage times (3 and 6 months).

d. Analysis of data and preparation of report (1 month).

Objective 3.

a. Collection and analysis of samples (2 months).

b. Animal biological assays (4 months).

c. Human biological assay (6 months).

d. In vitro digestibility assays (2 months)

e. Analysis of data and preparation of report (2 months).

D. Division of labor:

1. Anticipated responsibilities of host country researchers:

a. Collection and distribution of experimental materials.

b. To carry out the proposed analysis with the equipment available, to implement all biological assays, to collect and analyze the data, to prepare progress and final reports as well as the pertinent scientific publications.

c. To select and train local and foreign students.

d. To attend meetings with U.S. counterparts, when necessary.

e. To suggest future research avenues, according to the results obtained.

2. Anticipated responsibilities of U. S. researchers:

Washington State University

Coordinate nutritional and technological research studies of dry beans; and

1. In cooperation with INCAP, carry out in vitro digestibility studies to determine chemical responses of polyphenols and proteins to soaking, heating and digestion.
2. In cooperation with INCAP, the University of Puerto Rico and Michigan State University, apply high performance liquid chromatography (HPLC) to the separation and identification of polyphenolic compounds in dry beans of various colors.
3. In cooperation with INCAP and Kansas State University, investigate the nature of carbohydrates and structure of "hard-to-cook" dry beans by electron microscopy.

Kansas State University

In cooperation with INCAP and Washington State University, identify the physical and chemical changes that occur during storage of dry beans; identify the contributions of seed coat and cotyledon to the "hard-to-cook" development by utilizing autoradiography to study water absorption and the Instron to measure "cooking time"; and determine localization of minerals in dry beans using X-ray energy dispersive analyses.

University of Puerto Rico

In cooperation with INCAP and Washington State University, extract, isolate and identify polyphenolic compounds in dry beans of different colors.

Colorado State University

In cooperation with INCAP and Washington State University, collaborate in

14

identifying and improving the nutritional quality and availability of dry bean proteins

Michigan State University

In cooperation with INCAP, University of Puerto Rico, Kansas State University and Washington State University initiate a breeding program to identify and improve the susceptibility of dry beans to water penetration and softening during cooking; and identify explicitly the genetics associated with production of groups of polyphenolic compounds found in dry beans.

199

V. Estimated Budget for First Year

A. Host Country Institution

	<u>No.</u>	<u>Time</u>	<u>Expenditure</u>
1. Salaries and Wages			
a. P. I.	1	25	11,000
b. co-investigators	3	33	41,500
c. technicians	2	50	<u>7,500</u>
			60,000
2. Materials and Supplies			
a. chemical supplies			15,000
b. feeding supplies			<u>15,000</u>
			30,000
3. Travel			
a. 3 visits (one person/visit) to USA			5,500
4. Training costs			
a. student at INCAP			4,000
5. Common services (25% direct)			25,000
6. Indirect (31.5% negotiable with PAHO)			<u>(39,375)</u>
TOTAL			124,500

PERSONS PREPARING THIS DOCUMENT:

Host Country: Name:
 Ricardo Bressani
 Edgar Braham
 R. Gomez Brenes
 M. R. Molina
 L. G. Elias

Title & Address:

Chief, Division Agricultural & Food Science
 Assistant Chief, Division Agricultura & Food Science
 Scientist, Same Division
 Scientist, Same Division
 Scientist, Same Division

20

B. United States Institutions

Budget Totals

Washington State University

25% Matching

U.S. Aid

Salaries & Wages (25% P.I.)

7,500

10,000

Supplies

875

4,000

Travel

-

2,500

Indirect (42%)

6,720

-

15,095

16,500

Kansas State University

Salaries & Wages (20% P.I.)

4,500

6,500

Supplies

600

3,000

Indirect (49.3%)

4,165

-

9,265

9,500

University of Puerto Rico

Salaries & Wages

6,500

Supplies

1,500

Indirect (50%)

4,000

-

4,000

8,000

Colorado State University

Salaries & Wages

6,500

Supplies

1,000

Indirect

-

7,500

Michigan State University

Salaries & Wages

6,500

Supplies

2,000

Indirect

-

8,500

\$50,000

Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII Expended in US	*Expended in/for Host Country
Salaries and Wages						
1. Senior Personnel						
a. P.I.	<u>2</u>	<u>25%</u>	\$ 7,500	\$	\$	\$ 11,000
b. Co-investigators	<u>8</u>	<u>10-33%</u>	\$ 20,500	\$	\$	\$ 41,500
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students	<u>4</u>	<u>50%</u>	\$	\$	\$ 26,000	\$
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical			\$	\$	\$	\$
f. Technicians	<u>3</u>	<u>50-100%</u>	\$	\$	\$ 10,000	\$ 7,500
TOTAL SALARIES AND WAGES						
Fringe Benefits (if charged as Direct Costs 10%)			\$ 2,800	\$	\$ 3,600	\$ xxxx
Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 30,800	\$	\$ 39,600	\$ 60,000
Equipment			\$	\$	\$	\$
Materials and Supplies			\$ 3,000	\$	\$ 11,500	\$ 30,000
Travel--1. Domestic (Including Canada, U.S.)						
2. Foreign					2,000	6,000
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$
Shipment and Storage of Household Goods			\$	\$	\$	\$
Housing Allowances			\$	\$	\$	\$
Orientation and Medical Expenses			\$	\$	\$	\$
Publication Costs/Page Charges			\$	\$	\$	\$
Computer Costs			\$	\$	\$	\$
All Other Direct Costs Common Services 25%			\$	\$	\$	\$ 25,000
Training Costs			\$	\$	\$	\$ 4,000
Total Direct Costs (C through M)			\$ 33,800	\$	\$ 53,100	\$
Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs (31.5%)			\$ 17,000	\$	\$ xxxx	\$ (39,375)
Total Direct and Indirect Costs (N plus O)			\$ 50,800	\$	\$ 53,100	\$ 164,375

PERSONS PREPARING

THIS DOCUMENT:

	Name	Title and Address
in Country:	<u>L. G. Elias</u>	<u>Scientist, INCAP</u>
	<u>E. Braham</u>	<u>INCAP</u>
	<u>B. G. Swanson</u>	<u>Washington State University</u>

PLANNING OFFICE REPRESENTATIVE Adams

Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

GUATEMALA

I. Proposed Research

A. Topic:

BIOLOGICAL - Adaptation of beans (Effects of daylength and temperature upon yield, adaptation and stability).

SOCIOLOGICAL - Development of methodology to measure impact of new technology in bean production.

B. Constraint Area(s) to be Addressed

BIOLOGICAL - Wide vs. narrow (specific) adaptation of beans

C. Description of Proposed Research (production and non-production)

- SOCIOLOGICAL - 1. Work with ICTA personnel and Title XII graduate students to develop agro/socio/economic questionnaires, apply them in the field (Chimaltenango and Jutiapa) and develop data, storage and analysis capabilities.
2. Identify agronomic constraints on bean production and study the role of beans in the farming systems.
3. Evaluate new technology for bean production on small farms.

Broad objectives: 1. To develop valid methods of judging the merit of a potentially useful production practice when the evaluations are carried out, not on the experiment station but under the conditions of ultimate use such as on the small farm and under the management system prevailing thereon. 2. To develop a credible system for estimating the degree of small farm acceptance of a given production practice, and to provide through agronomic and socio-cultural feedback a means of determining causes for acceptance or non-acceptance.

Overall objective: To determine the biological, economic and social role of beans in the farming system of small farms, and to determine how these factors modify the production and use of beans.

D. Anticipated Long-range research goal(s)

BIOLOGICAL - To improve the efficiency of breeding for wide adaptation or narrow (specific) adaptation. To acquire understanding of the components of adaptation and stability.

20

Country Guatemala

SOCIOLOGICAL - To have developed a refined methodology for research evaluation of new bean production in small farmers context and training of ICTA personnel to carry on the work themselves.

E. First Year Objective(s)

SOCIOLOGICAL - Choose participants, begin questionnaire construction, and select field sites.

F. Type of Professional Personnel Required

BIOLOGICAL - Graduate students

SOCIOLOGICAL - Graduate students, professional of ICTA, U.S. University professionals

II. Potential Collaborators

B I O L O G I C A L

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.: Co-Investigators:	P. Masaya	Breeder/Physiologist	ICTA
U.S. -P.I.: Co-Investigators:	D.H. Wallace	Breeder/Physiologist	Cornell Univ., Ithaca, N.Y.

S O C I O L O G I C A L

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.: Co-Investigators:	Selvin Arriaga Marco A. Martinez Sandra Calderon Essau Somoyoa	Economist Agronomy Agronomy Economics	ICTA ICTA ICTA ICTA
U.S. - P.I.: Co-Investigators:	Chris Wien Roger Sandsted Patricia Garrett	Veg. Crops Veg. Crops Rural Sociology	Cornell Cornell Cornell

Country Guatemala

III. Anticipated Procedures

A. Proposed research site(s):

BIOLOGICAL - Chimaltenango 1786 meters
 Jutiapa 0 to 900 meters
 Quezaltenango 2400 meters

SOCIOLOGICAL - Villages in Chimaltenango province (highland plateau)
 Villages in Jutiapa province (eastern lowlands)

B. Proposed research methodology in brief:

BIOLOGICAL - Data will be collected on: days to flowering, concentration of flowering, days to maturity, no. branches, no. nodes, no. pods, location of pods on plant, location of flowers, seeds/pods, avg. seed weight, seed yield, biological yield, duration of leaf foliage, harvest index.

SOCIOLOGICAL - Use questionnaires, field visits, test plots with the agronomic constraints

C. Approximate time schedule over first years:

SOCIOLOGICAL - To be worked out as research site is specified.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

BIOLOGICAL - Field evaluation in high, medium and low elevation under bean growing conditions that make the data meaningful for the small farmer conditions. This may, if possible, be contrasted with a monoculture system.

SOCIOLOGICAL - Supervise field work of students, participate in discussions and general operation of project.

2. Anticipated responsibilities of U.S. researchers:

BIOLOGICAL - Controlled environment studies of daylength and temperature effects on bean lines with known (or partly known) adaptation to low or high growing temperatures - lines that are insensitive, moderately sensitive or very sensitive to daylength, lines with wide and narrow adaptability, etc.

SOCIOLOGICAL - Assist in bringing the project to reality in all ways possible - data management, etc.

Country Guatemala

IV. Training Component (indicate number, levels and sites)

BIOLOGICAL - All work to be done through MS (mostly) and Ph.D. candidates

SOCIOLOGICAL - 4 graduate students (mix of Latin American and U.S.)

John

Country Guatemala

V. Estimated Budget for First Year

B I O L O G I C A L

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII	
					Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.			\$ 10,000	\$	\$	\$
b. Co-investigators			\$	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students	1		\$	\$	\$	\$ 10,000
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical			\$	\$	\$	\$
f. Technicians			\$	\$	\$	\$
TOTAL SALARIES AND WAGES			\$	\$	\$	\$
B. Fringe Benefits (if charged as Direct Costs)			\$	\$	\$ 10,000	\$
C. Total Salaries, Wages, and Fringe Benefits (A+B)			\$	\$	\$	\$
D. Equipment			\$	\$	\$	\$
E. Materials and Supplies			\$	\$	\$	\$ 10,000
F. Travel - 1. Domestic (including Canada, U.S.)			\$	\$	\$	\$
2. Foreign			\$	\$	\$	\$
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$	\$
I. Orientation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Page Charges			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$	\$
L. All Other Direct Costs			\$	\$	\$	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$	\$	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)			\$	\$	\$	\$
Total Indirect Costs			\$	\$	\$	\$
P. Total Direct and Indirect Costs (N + O)			\$	\$	\$	\$

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	<u>P. Masava</u>	<u>Bean Program Coordinator</u> <u>5a Ave. 12-31 zona 9 Guatemala City,</u> <u>Guatemala</u>
U.S.	<u>Donald H. Wallace</u>	<u>Professor of Vegetable Crops & Plant Breeding</u>

S/C PLANNING OFFICE REPRESENTATIVE M.W. Adams

*Includes foreign travel and training for host country nationals in the U.S.

201

Country Guatemala

V. Estimated Budget for First Year

S O C I O L O G I C A L
Total Budget - including adaptation

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII	
					Expended in US	Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.			\$ 45,000	\$	\$	\$
b. Co-investigators			\$	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students	4		\$	\$	\$	\$ 40,000
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical			\$	\$	\$	\$
f. Technicians - programmer			\$	\$	\$ 7,500	\$
TOTAL SALARIES AND WAGES			\$	\$	\$	\$
B. Fringe Benefits (If charged as Direct Costs)			\$	\$	\$ 2,500	\$
C. Total Salaries, Wages, and Fringe Benefits (A+B)			\$	\$	\$	\$
D. Equipment			\$	\$	\$	\$
E. Materials and Supplies			\$	\$	\$	\$
F. Travel - 1. Domestic (including Canada, U.S.)						
2. Foreign						
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$ 30,000	\$ 40,000
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$	\$
I. Orientation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Page Charges			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$ 2,000	\$ 10,000
L. All Other Direct Costs			\$	\$	\$	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$	\$	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			\$	\$	\$	\$
P. Total Direct and Indirect Costs (N + O)			\$ 45,000	\$	\$ 45,000	\$ 80,000

PERSONS PREPARING
THIS DOCUMENT:

Host Country:

U.S.

B/C PLANNING OFFICE REPRESENTATIVE M.W. Adams

*Includes foreign travel and training for host country nationals in the U.S.

208

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE
(Abstract)

ECUADOR

INIAP (Min. of Agric.) Cesar Chirriboga, Legume
program leader

Cornell University

Dr. D.H. Wallace, Dr. Pat Garrett (Dr. Peter Gore)

TOPIC: Program similar to Guatemala, but the Ecuador sites
to be chosen nearer the equator to minimize the
daylength variable in the field.

201

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

GUYANA

I. Proposed Research

A. Topic: *Integrated Cowpea Production Systems, **Evaluation of Genotypes and Socioeconomic Study.

B. Constraint Area(s) to be Addressed

- *1. Efficient Small Farm Production Systems
2. Suitable Agronomic Practices for Each Production System
3. Adaptation to Environmental Stress Conditions
4. Host Country Personnel Training
- **5. SocioCultural Constraints
6. Limitations Due to Pests and Diseases
7. Limitations of the Physical Environment
- ***8. Education, Training and Research Capability

C. Description of Proposed Research (production and non-production)

- *1. Definition of categories of soil and ecological conditioning and types of physiological stress parameters.
 2. Field trials comparing selected intercropping systems within each set of ecological conditions.
 3. Accommodation of prominent cowpea cultivars identified in variety testing programs.
 4. Adjustment of research items to findings of sociological cultural data analysis.
-
- **1. Sample forms representing the type of conditions found in the general area. Gather information on farming practices, types of cowpeas used, management, and social variables which might limit the diffusion of new types of varieties.
 2. Work with investigator in Guyana to develop a system to screen germplasm. Train personnel in Guyana and graduate students from Guyana in U.S. schools.

D. Anticipated Long-range research goal(s)

- *1. Development of profitable cowpea production practices for several sets of environmental conditions.
 2. Suitable procedures for minimization of disease and pest incidence in the field.
-
- **1. Integration of social conditions and technology to improve the level of living of the farm families.
 2. To increase the total food resource of the country.
 3. Contribute to the breeding project and the other technical projects working on cowpeas.
 4. To establish a germplasm base for breeding of adapted high yielding cultivars.

*Colorado State **Mississippi State ***Both

2

Country Guyana

E. First Year Objective(s)

*Initiation of field experiments at research sites with treatments defined by problem identification.

Academic training (MS program) of 1 U.S. and 1 local student.

**Conduct one sociological field study. The selection of suitable germplasma for further evaluation as breeding material and testing in the farming systems.

F. Type of Professional Personnel Required:

*Professional agronomist, and graduate assistant from U.S. and host country.

**Three graduate students.

II. Potential Collaborators

Host Country - P.I.:	Julius A. Ross	Agronomist	Mon Repos
Co-Investigators:	-	Pathologist	-
U.S. - P.I.:	J.O. Garner	Horticulturist	Miss. State Univ.
- P.I.:	C.J. DeMooy	Agronomist	Colorado State
Co-Investigators:	Louis Bluhm	Sociologist	Miss. State Univ.
	John Saunders	Sociologist	Miss. State Univ.
	C.C. Singletary	Horticulturist	Miss. State Univ.

III. Anticipated Procedures

A. Proposed research site(s):

1. Pomeroun
2. Central Agricultural research station
3. Kairuni research station
4. Mississippi State University
5. Colorado State University (for data interpretation)

B. Proposed research methodology in brief:

- *1. Problem identification and description of ecological conditions in each production region.
2. Evaluation of traditional production systems.
3. Design and lay-out of field trials involving the following variables as necessary: companion crops, population, planting date, mineral nutrition and aluminum toxicity, factors affecting moisture balance, weed control measures, tillage

*Colorado State **Mississippi State ***Both

Country Guyana

- practices, mulching, factors affecting biological N-fixation.
4. Demonstration plots in farmers fields.

- **1. Establish linkage with host institution.
2. Position a graduate student (M.S.) in the host country.
3. Use local people to work a field study* under the direction of a U.S. Sociologist.
4. Recruit a student from Guyana to return to U.S. institution.
5. Analyze data at Mississippi State University.

Germplasma evaluation by:

1. Yield data (variety trials)
2. Growth Analysis
3. Screening for disease and pest resistance (In field screening)

(*Field study will be a sample survey of farmsteads in the Pomeroon region; however, informal observation will be used as well.)

C. Approximate time schedule over first year:

- *2 months: problem identification.
- 1 month: design and layout of field trials.
- 4 months: conducting 3 field trials.
- 3 months: training of technicians and graduate students.
- **1-3 months: make contacts in the host country.
- 4-6 months: observe field conditions in an informal way.
- 7-9 months: prepare the research instrument.
- 10-12 months: Do the field study.

D. Division of labor:

1. Anticipated responsibilities of host country researchers:
 - **Provide information, help in the planning, provide transportation and personnel for the field work. Provide skilled and unskilled labor for field work in Guyana. Supervise field work in Guyana.
2. Anticipated responsibilities of U.S. researchers:
 - **Position a U.S. graduate student in the host country for one year; help conduct the field study; analyze the data. Assist host country personnel in developing needed research capability. Supervise graduate student research. Implement a germplasm development and screening program.

IV. Education Component (indicate number, levels and sites).

**U.S. scientists will provide short courses on various topics in the host country; train graduate students from Guyana in the U.S.

*Colorado State **Mississippi State ***Both

Country Guyana

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII	
					Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	2		\$ 12,000	\$	\$	\$
b. Co-investigators	2		\$ 5,715	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. B Sc. Students			\$	\$	\$	\$
c. Graduate Students	3		\$ 4,000	\$	\$ 10,000	\$ 12,000
d. Pre-Baccalaureate Students			\$	\$	\$	\$ 2,000
e. Secretarial-Clerical	1	10%	\$ 800	\$	\$	\$ 6,000
f. Unskilled Labor			\$	\$	\$	\$
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (if charged as Direct Costs)			\$	\$	\$	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$	\$	\$ 1,380	\$
D. Equipment Jeep, Screenhouse			\$	\$	\$	\$ 10,000
E. Materials and Supplies			\$ 1,185	\$	\$ 5,000	\$ 6,000
F. Travel--1. Domestic (Including Canada, U.S.)						
2. Foreign			\$	\$	\$	\$ 9,000
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$	\$
I. Orientation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Paper Charges ^{books} reprints, etc.			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$	\$
L. All Other Direct Costs Fuel, Maintenance,			\$	\$	\$	\$
M. Training Costs Housing, Subsistence			\$	\$	\$	\$
N. Total Direct Costs (G through M)			\$	\$	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			\$	\$	\$ 6,120	\$
P. Total Direct and Indirect Costs (N plus O)			\$ 22,500	\$	\$ 22,500	\$ 45,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	Julis Ross	D14 Central Agric. Station Mon Repos, E.C.D. Guyana, S.A.
U.S.	James Garner, Clyde Singletary Louis Blum, John Saunders	Department of Hort., Ms. State, MS Department of Sociology, Ms. State, MS
B/C PLANNING OFFICE REPRESENTATIVE	D.H. Wallace	

* Includes foreign travel and training for host country nationals in the U.S.

Country Guyana

V. Estimated Budget for First Year

	Time % on CRSP	Proposed Budget Estimate			
		Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII	
				Expended in US	*Expended in/for Host Country
A. Salaries and Wages					
1. Senior Personnel					
a. P.I.	1	25	\$ 7,000	\$ 7,000	\$
b. Co-investigators	3	8	\$ 7,207	\$ 7,207	\$
2. Other Personnel (Non-Faculty)					
a. Research Associates-Postdoc	3	8	\$	\$ 7,000	\$
b. B. Sc. Students	2	50	\$	\$ 10,000	\$ 10,000
c. Graduate Students (U.S.)	2	50	\$	\$ 10,000	\$ 10,000
d. Pre-Baccalaureate Students			\$	\$	\$
e. Secretarial-Clerical			\$	\$	\$
f. Technicians	3	100	\$	\$	\$ 6,000
TOTAL SALARIES AND WAGES					
B. Fringe Benefits (if charged as Direct Costs)			\$ 2,155	\$	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 16,362	\$	\$
D. Equipment			\$	\$	\$ 6,000
E. Materials and Supplies			\$	\$ 1,000	\$ 3,000
F. Travel--1. Domestic (including Canada, U.S.)					
2. Foreign PL and 3 consultants				1,000	5,000
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$
G. Shipment and Storage of Household Goods			\$	\$	\$
H. Housing Allowances			\$	\$	\$
I. Orientation and Medical Expenses			\$	\$ 500	\$
J. Publication Costs/Page Charges/Books, reprints, etc.			\$	\$ 793	\$ 1,000
K. Computer Costs			\$	\$ 500	\$
L. All Other Direct Costs (Housing, Subsistence, Fuel, Mileage, etc.)			\$	\$	\$ 2,000
M. Training Costs			\$	\$	\$
N. Total Direct Costs (C through M)			\$ 16,352	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) 37.7% both on and off campus			\$ 6,158	\$	\$
Total Indirect Costs			\$ 6,158	\$	\$
P. Total Direct and Indirect Costs (N plus O)			\$ 22,520	\$ 45,000	\$ 45,000

PERSON PREPARING

THIS DOCUMENT:

	Name	Title and Address
Host Country:	Julius Ross	D14 Central Agric. Station
Fringe 15.2%	7/1/80 on 9000	Mon Repos, E.C.D.
	2432 on 1600 C.J. deMooy	Guyana, S.A.
U.S.		Professor of Agronomy
		Department of Agronomy
B/C PLANNING OFFICE REPRESENTATIVE	D.H. Wallace	Colorado State University
		Fort Collins, CO 80524

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

BRAZIL

I. Proposed Research

A. Topic: Insect Pathogens in Cowpea Pest Management Systems for Developing Nations

B. Constraint Area(s) to be Addressed

1. Limitations due to Pests and Diseases (insects)
5. Storage and Commodity Maintenance (insect pests)

C. Description of Proposed Research (production and non-production)

Insect pests are a major constraint to production and storage of cowpeas in Brazil and other LDCs. Ten-fold increases in cowpea yield have been realized in some areas by extensive use of insecticides. Since they can be produced in LDCs, microorganisms pathogenic to the major pests of cowpeas will be developed for integration into insect control programs. The current limitations to microbial control on this crop are (a) virtually no research data, either basic or applied, available on the topic, and (b) virtually no experienced insect pathologists working on this crop worldwide. Alleviation of these limitations will be sought by (a) conducting basic and applied research in a cowpea-producing nation (Brazil) and in the U.S. to increase the data base, (b) sending experienced insect pathologists to Brazil to consult and to conduct experiments, and (c) training scientists and aspiring scientists from LDCs in insect pathology and microbial control. Training will include basic as well as applied concepts to provide the trainee with adequate knowledge to function independently in insect pathology in his or her home LDC.

D. Anticipated Long-range research goal(s)

Develop insect pathogens as effective, economical, and safe cowpea pest management tools fully compatible (integrated) with other insect control practices used by LDC farmers; and train LDC scientists in insect pathology so they can function independently in microbial control projects in cowpeas and other crops.

E. First Year Objective(s)

1. Establish an insect pathology laboratory in CNPAF/EMBRAPA/Goiania, Brazil.
2. Conduct surveys for pathogens of cowpea pests in cowpea growing regions.
3. Establish insect colonies and conduct screening tests to identify microbial isolates with promise for pest control.
4. Initiate identification, characterization, production and formulation studies of selected pathogens.

215

Country Brazil

F. Type of Professional Personnel Required

In addition to existing Brazilian and U.S. staff: One insect pathologist (Ph.D.), two full-time technicians (B.S.), and at least one graduate student (Ph.D. candidate).

II. Potential Collaborators

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.:	Almiro Blumenschein	Chief	CNPAF, Goiania
Co-Investigators:	B.P. Neves	Cowpea Entomology	CNPAF, Goiania
U.S. - P.I.:	D.W. Roberts	Insect Pathology	BTI
	R.S. Soper	Insect Mycology	USDA at BTI

III. Anticipated Procedures

A. Proposed research site(s):

Centered at CNPAF in Goiania. Survey for pathogens primarily in N and NE Brazil, field studies in Goiania and in collaboration with scientists in NE Brazil (e.g. Univ. Fed. Ceara, Fortaleza). Belem and an Amazonas site could be included as well. Basic support research on identification, selection, characterization, production, formulation and strain improvement will be conducted at BTI, Ithaca, New York.

B. Proposed research methodology in brief:

The most important pests of cowpea in Brazil are Chalcodermus bimaculatus (a coleopterous pod feeder), Callosobruchus maculatus (a coleopterous storage pest), and Empoasca kraemeri (a leafhopper). These will be the target pests although minor pests (e.g. Elasmopalpus lignosellus, the lesser cornstalk borer) will not be totally ignored. The first step will be to conduct surveys of existing disease agents in the pest populations in Brazil, primarily the NE and Amazonas. Since no insect pathologists have previously worked in these areas, the survey should be very fruitful. The work will continue throughout the study, but will be emphasized in the first year. Later years will emphasize studies to characterize and produce pathogens, both locally discovered and imported, which prove promising in preliminary pathogenicity tests conducted in Brazil and the U.S. (U.S. studies will use Ch. aeneus, Ca. maculatus, and Em. fabae.) Field applications will be made after consulting with subsistence-level growers to determine their existing technology (methods, equipment, etc.) and the use of pathogens integrated

Country Brazil

as much as possible into these systems. The approaches will include colonization of new pathogens, encouraging existing pathogens, and mass introductions similar to insecticide application. Fungal pathogens of insects will be emphasized, since this is the pathogen group most effective against beetles and leafhoppers.

C. Approximate time schedule over first year:

The new Goiania research facility will not be completed until approximately March 1981. Accordingly, the laboratory research will be initiated at Boyce Thompson Institute in late 1980, and will begin in Brazil as soon as possible. Field applications will begin in the second season, after identification of promising pathogens and familiarization with existing cowpea production and storage methods in Brazil.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

- a) Goiania will aa) provide laboratory space, field plots (including preparation and maintenance), assistance with insect rearing, and bb) interact fully with the U.S. scientists working on the project. Also they will cc) assist in helping U.S. scientists make contacts elsewhere and in dd) learning existing cowpea technology.
- b) Brazilian scientists elsewhere will assist in the aa) survey work and the bb) field trials. If at all possible, we would like for several scientists from the NE and Amazonas to cc) spend several weeks or months in the insect pathology lab in Goiania.

2. Anticipated responsibilities of U.S. researchers:

- a) Coordinate the project and train Brazilian staff in insect pathology.
- b) Provide an experienced insect pathologist to conduct the work in Brazil.
- c) Survey for cowpea pest pathogens in Brazil.
- d) Identify, culture and characterize pathogens.
- e) Select virulent pathogens, and improve the best natural strains.
- f) Conduct and coordinate field trials.

IV. Training Component (indicate number, levels and sites)

At least one Ph.D. level student will be trained (class work will be in Brazil and the U.S., the majority of the research will be in Brazil). With further financial assistance of CNPAF, a second student could be

211

Country Brazil

added to the program. Additionally, scientists from cowpea-growing areas will be invited to work in Goiania in the new insect pathology laboratory to learn insect pathology techniques so they can effectively use microbial agents for pest management.

2

Country Brazil

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Instituc.	Contrib. from Host Instituc.	Requested from Title XII Expended in US	*Expanded in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	25	\$ 8700 ^a	\$	\$	\$
b. Co-investigators	1	20	\$ 6000 ^b	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	1	100	\$	\$	\$	\$ 20,000
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students	1		\$	\$ 10,000	\$	\$
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical	1	10	\$	\$	\$	\$
f. Technicians	1	100	\$	\$	\$ 3000 ^a	\$ 3,000
TOTAL SALARIES AND WAGES						24,000
B. Fringe Benefits (if charged as Direct Costs)	10.75%		\$ 2960 ^a	\$	\$	\$ 3,350
C. Total Salaries, Wages, and Fringe Benefits (A + B)						
			\$ 17660	\$	\$ 9000	\$ 27,350
D. Equipment			\$	\$	\$	\$ 17,000
E. Materials and Supplies			\$ 4000	\$	\$ 5000	\$ 9,000
F. Travel—1. Domestic (Including Canada, U.S.)			600			
2. Foreign				2,000 (inside Brazil)		8,500
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$	\$ 1,300
G. Shipment and Storage of Household Goods			\$	\$	\$	\$ 3,000
H. Housing Allowances			\$	\$ 6,000	\$	\$ 2,000
I. Orientation and Medical Expenses			\$	\$	\$	\$ 500
J. Publication Costs/Paper Charges			\$	\$	\$	\$
K. Computer Costs			\$	\$	\$	\$
L. All Other Direct Costs			\$	\$	\$	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)						\$ 14,000
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs 55% S+W						\$ 9740 ^a
P. Total Direct and Indirect Costs (N plus O)						\$ 32,000
PERSONS PREPARING THIS DOCUMENT:						
Host Country:	Name		Title and address			
	Almiro Blumenschein ¹		¹ Chief of CNPqF			
	Belmiro P. Das Neves ²		² Cowpea Entomology			
	Jose Martins ³		³ Leader Entomology Lab.			
	João Pratagil P. de Araujo ⁴		⁴ Cowpea Breeding/Seed Quality			
	Earl E. Wyatt ⁵		⁵ Cowpea Breeding (IITA/CNPqF)			
U.S.:	D.W. Roberts ¹ ; R.S. Soper ² ; R.A. Daoust ¹		¹ Insect Path./BTI		² Insect Mycol./USDA	
	P.K. Hughes ³		³ Insect Physiol./BTI			

B/C PLANNING OFFICE REPRESENTATIVE W. Adams

* Includes foreign travel and training for host country nationals in the U.S.

211

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

BRAZIL

I. Proposed Research

- A. Topic: Improved techniques for development of multiple disease resistance in Phaseolus vulgaris L.
- B. Constraint Area(s) to be Addressed
Limitations due to pests and diseases.
- C. Description of Proposed Research (production and non-production)
Bean diseases, including anthracnose, rust, angular leaf spot, common blight and common bean mosaic are limiting factors in the production of the important bean crop in Brazil. One of the best methods of controlling these diseases is the development of disease resistant varieties. Experimentation will be undertaken to initiate uniform and typical disease development so that accurate data can be obtained on the reaction of beans to the diseases involved. Background research on inoculation techniques and environmental influences must be accomplished. Quantitative methods for determining disease reaction will be developed so that bean cultivars with high levels of disease resistance can be identified. Comparative studies on breeding methodology most appropriate for multiple disease reaction determinations will be included.
- D. Anticipated Long-range research goal(s)
Development of new, superior bean cultivars with multiple disease resistance.
- E. First Year Objective(s)
(1) Study the reliability of various disease testing sites in Brazil.
(2) Determination of most effective inoculum levels, methods of applying inoculum, and the influences of environmental factors.
- F. Type of Professional Personnel Required
1) Plant pathologists
2) Plant breeders

II. Potential Collaborators

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.:	A. Sartorato I.F. Antunes	Plant Pathologist Plant Breeder	EMBRAPA/CNPAF BR 153-Km 4 C. Postal 179 74.000-Goiania-Goias

Country Brazil

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
U.S.	P.I.: D.J. Hagedorn F.A. Bliss	Plant Pathologist Plant Breeder	Univ. of Wisconsin 1630 Linden Drive Madison, WI 53706

III. Anticipated Procedures

A. Proposed research site(s):

Goiania - Goias - Brazil - and appropriate outlying sites.
Madison - Wisconsin - USA

B. Proposed research methodology in brief:

Large scale bean plantings will be made in selected sites in Brazil to take advantage of natural environmental factors and pathogen inoculum conducive to disease development. These disease nurseries will be monitored at appropriate intervals, and if needed, artificial inoculation of the beans will be undertaken. Greenhouse and laboratory research will determine the best way to grow inoculum, apply it and incubate inoculated plants. Related studies will determine if beans can best be inoculated simultaneously or in sequence with two or more pathogens, and which pathogens can be studied in each manner; proper timing and environmental factors must be researched. The acquisition, handling, storage and application of naturally-occurring pathogen inoculum will be studied. For instance, viable Isariopsis griseola can be stored for at least a year as a dry leaf powder. Related studies are needed with other bean pathogens. To accurately identify highly disease resistant bean plants, an efficient method for obtaining quantitative data on disease reaction must be developed and used carefully. Several kinds of plant breeding methodology, including a modified backcross system, will be studied for efficiency in the development of disease resistance in beans.

C. Approximate time schedule over first year:

October - July. Study comparative reliability of four disease testing sites for reaction of beans to rust, angular leaf spot, anthracnose and common blight. Jan. - Dec. Study inoculation techniques and environmental influences on disease reactions.

D. Division of labor:

1. Anticipated responsibilities of host country researchers:

Identify appropriate bean germ plasm for disease reaction investigations, and make large scale plantings for disease testing.

Country Brazil

Study reliability of disease testing sites and large scale inoculation techniques.

Study breeding methodology.

2. Anticipated responsibilities of U.S. researchers:

Study most appropriate inoculation techniques and environmental influences.

Study sequential versus simultaneous inoculations for accurate disease reactions.

Provide guidance in graduate training.

Provide guidance in breeding methodology.

IV. Training Component (indicate number, levels and sites)

One graduate student at Ph.D. level.

Two visiting scientists - no degree.

Department of Plant Pathology - Univ. of Wisconsin - *Madison.

Country Brazil

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title III Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	15	\$ 6,600	\$	\$	\$
b. Co-investigators	1	02	\$ 640	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	1	80	\$	\$	\$ 12,000	\$
b. Other Professionals	1	25	\$ 4,375	\$	\$	\$
c. Graduate Students	1	100	\$	\$	\$	\$ 6,500
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical	1	05	\$ 450	\$	\$	\$
f. Technicians	2	100	\$	\$	\$	\$ 7,300
TOTAL SALARIES AND WAGES			\$ 2,433	\$	\$ 1,146	\$
B. Fringe Benefits (if charged as Direct Costs)			\$	\$	\$	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$14,498	\$	\$ 13,146	\$ 13,800
D. Equipment			\$ 6,000	\$	\$	\$ 8,000
E. Materials and Supplies			\$	\$	\$ 1,200	\$ 3,200
F. Travel—1. Domestic (Including Canada, U.S.)						
2. Foreign						
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$ 3,000	\$ 3,000
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$ 1,000	\$ 2,500
I. Orientation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Press Charges			\$	\$	\$	\$
K. Computer Costs			\$ 600	\$	\$	\$
L. All Other Direct Costs Hourly Labor			\$ 800	\$	\$ 1,500	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$21,878	\$	\$ 19,840	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs ^{42%}			\$ 9,197	\$	\$ 8,335	\$
P. Total Direct and Indirect Costs (N plus O)			\$31,075	\$	\$ 28,175	\$ 30,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	A. Sartorato and I. F. Antunes	Plant Pathologist EMBRAPA/CNPqF BR 157 Plant Breeder C. Postal 179 74000 Golanias, Brazil
U.S.	D. J. Hagedorn	Univ. of Wisconsin 1630 Linden Drive Madison, WI 53706
B/C PLANNING OFFICE REPRESENTATIVE		M. Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

J. J. J.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

BRAZIL

I. Proposed Research

- A. Topic: Development of new and superior host-rhizobium combinations in Phaseolus vulgaris that fix high levels of nitrogen under cropping systems suitable to small farming operations in Brazil.
- B. Constraint Area(s) to be Addressed
Plant response limitations because of poor nutrient use efficiency.
- C. Description of Proposed Research (production and non-production)
Beans are an important food in the Brazilian diet supplying good levels of protein to many inhabitants. Seventy percent of the 2.5 million tons grown annually in Brazil are cropped in association with maize and are grown on farms less than 10 ha. The high cost of N fertilizers preclude the addition by small farmers of large amounts of N to insure sufficient yields of current cultivars. Researchers believe that genetic variability in P. vulgaris and Rhizobium spp. for more efficient N₂ fixation can lead to the development of cultivars that are high yielding under low soil nitrogen. It is proposed to screen Phaseolus germplasm and Rhizobium strains under differing levels of N to identify host-plant-rhizobium associations that are efficient nitrogen fixers and will give high seed yields under no supplemental nitrogen fertilization.
- D. Anticipated Long-range research goal(s)
Develop new and superior N₂ fixing varieties of beans that give high yields without supplemental N₂ fertilizer under monoculture and bean-maize association cropping systems.
- E. First Year Objective(s)
Develop methodology to screen for genotype-rhizobium associations that show high levels of Nitrogen fixation.
- F. Type of Professional Personnel Required
Plant breeder experienced in N₂ fixation; microbiologists; soil fertility and plant nutrition scientist.

Country Brazil

II. Potential Collaborators

	<u>Researchers</u>	<u>Discipline</u>	<u>Professional Address</u>
Host Country - P.I.:	Dr. Keuktki Lee	Microbiologist	EMBRAPA
Co-Investigators:	M. Teixeira	Plant Breeder	EMBRAPA
	P. Pereira	Microbiologist	EMBRAPA
U.S. - P.I.:	Dr. F.A. Bliss	Plant Breeder	Univ. of Wisconsin

III. Anticipated Procedures

A. Proposed research site(s):

Experimental research facilities of EMBRAPA, Goiania, Brazil; facilities of the State University and State Agricultural Experiment Station, Rio Grande do Sul; facilities of N₂ fixation program Kilometer 47, Embrapa, Rio de Janeiro; facilities of Department of Horticulture, University of Wisconsin, Madison, Wisconsin.

B. Proposed research methodology in brief:

I. Young bean plants will be screened for early nodulation in boxes (1.50 x 2.0 x 0.30 m in size) with soil and nitrogen-free medium. The plants will be assayed for dry weight, total N and nitrogenase activity at 25 days after planting.

The plant rhizobium symbionts with the earliest nodulation will be selected. The symbionts with late nodulation will also be selected in the same way.

II. The gene pool will be screened for high seed production at two levels of nitrogen fertilizer (0 N and 30 N Kg/ha) in monocrops and associated crops during four or five cycles. The selected material will be tested in all of possible combinations of nitrogen levels and will be assayed for nitrate reductase, nitrogenase activity and total N.

C. Approximate time schedule over first year:

Identify genotype-rhizobium associations that show early and late nodulation under 0 levels of N₂ (May 1981 - Oct. 1981); Screen germplasm for

20

Country Brazil

genetic variants useful in breeding program for improved N₂ fixation efficiency (Oct. 1980 - Oct. 1981).

D. Division of labor:

1. Anticipated responsibilities of host country researchers:

Dr. Keuk-ki Lee (Ph.D.) provide leadership for microbiological aspects and technical inputs into research conducted in Brazil; ascertain levels of Mb and Zn to insure maximum N₂ fixation; Mr. Pedro A. Pereira (Ing) develop screening techniques for assessing efficiency of rhizobium strains on nitrogen fixing ability of bean genotypes; Measure NO₃ Reductase activity (Hageman procedure) measure nitrogenase activity; Mr. Marcelo G. Teixeira (Ing) screen germplasm for promising genotypes that show high N₂ fixation; develop new and superior genotypes of beans that efficiently fix N₂ under low soil nitrogen levels in monoculture and in maize associated cropping systems.

2. Anticipated responsibilities of U.S. researchers:

Dr. Fred A. Bliss (Ph.D.) screen germplasm for promising genotypes that show high N₂ fixation; develop new and superior genotypes; exchange germplasm to insure material is developed to meet Brazilian objectives; train graduate students; provide training programs for Brazilian collaborators.

IV. Training Component (indicate number, levels and sites)

Laboratory technician (1) H.S. diploma, KM 47 Rio de Janeiro; Engineers (2) M.S. 3 months Univ. of Illinois; 4 months Univ. of Wisconsin; Graduate Assistant (1), M.S. 4 months at Embrapa; Graduate Assistants (2) degree program at Univ. of Wisconsin

226

Country Brazil

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Instituc.	Contrib. from Host Instituc.	Requested from Title XII Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	10	\$ 3,000	\$	\$	\$
b. Co-investigators	3	30	\$	\$	\$	\$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			\$	\$	\$	\$
b. Other Professionals			\$	\$	\$	\$
c. Graduate Students	3	150	\$	\$	\$ 7,000	\$ 14,000
d. Pre-Baccalaureate Students			\$	\$	\$	\$
e. Secretarial-Clerical	1	5	\$ 500	\$	\$	\$
f. Technicians	1	10	\$ 1,500	\$	\$ 1,500	\$
TOTAL SALARIES AND WAGES			17.0%			
B. Fringe Benefits (if charged as Direct Costs)			\$	\$	\$	\$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			\$ 5,000	\$	\$	\$
D. Equipment			\$	\$	\$	\$ 11,400
E. Materials and Supplies			\$ 1,000	\$	\$ 1,000	\$ 500
F. Travel--1. Domestic (Including Canada, U.S.)						
2. Foreign						
3. Accompanying Dependents (for long-term assignments)			\$	\$	\$ 1,000	\$ 1,000
G. Shipment and Storage of Household Goods			\$	\$	\$	\$
H. Housing Allowances			\$	\$	\$ 2,000	\$ 2,000
I. Orientation and Medical Expenses			\$	\$	\$	\$
J. Publication Costs/Page Charges			\$ 500	\$	\$ 500	\$
K. Computer Costs			\$ 500	\$	\$	\$
L. All Other Direct Costs Hourly Labor			\$	\$	\$ 2,000	\$
M. Training Costs			\$	\$	\$	\$
N. Total Direct Costs (C through M)			\$	\$	\$	\$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			\$	\$	\$	\$
P. Total Direct and Indirect Costs (N plus O)			\$	\$	\$ 30,000	\$ 30,900

PERSONS PREPARING THIS DOCUMENT:

Name	Title and Address		
Host Country:			
U.S.			

B/C PLANNING OFFICE REPRESENTATIVE N.W. Adams

* Includes foreign travel and training for host country nationals in the U.S.

227

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

(Title)

CIAT (Colombia)

Collaborators: Dr. Jeremy Davis
Dr. Peter Graham

Michigan State University

Dr. M.W. Adams

Dr. Frank Dazzo

CONSTRAINT: Plant Response Limitations:

TOPIC: Improving yield and stress resistance in beans through exploitation of carbohydrate partitioning and architectural patterns.

CONSTRAINT: Nitrogen-fixation

TOPIC: Micro-symbiont competition in the nitrogen-fixing rhizobium-bean symbiosis.

A P P E N D I X H

EXAMPLES OF PLANNING OFFICE COMMUNICATIONS
in preparation for
LDC RESEARCH DESIGN DEVELOPMENT TRIPS

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

It is indeed a pleasure to be writing this letter inviting your active participation in the next phase of the development of an international Collaborative Research Support Program (CRSP) in Beans and Cowpeas sponsored by USAID through Michigan State University. Previous communications with you and others from your country have suggested there is interest in working with the Bean/Cowpea CRSP as part of the research program there. Research related to small farm production and consumption of beans/cowpeas is particularly important since such research could contribute a great deal to the resolution of significant food and hunger problems. We are presently working to make the resources of this Program available to you as appropriate.

Much has happened in the last few months. There have been several meetings with representatives of African and Latin American countries discussing ways in which Bean/Cowpea CRSP activity might best be useful to countries in addressing the problems of world famine. From the results of these meetings and a review of the literature, there has emerged a set of country-related general research topics, with sub-items for specific research projects identified. These topics, taken together, make up the skeleton global research plan in beans and cowpeas, a plan which (1) must show a relationship to country interests, needs and prior research, (2) must avoid duplication from country to country wherever possible, and (3) must demonstrate substantive involvement of LDC scientists and show subsequent commitment of all parties concerned. The contributions of country representatives and representatives of the International Centers have been essential to our progress to date.

We have also begun identifying U.S. institutions and their professional research personnel interested in working in Africa and Latin America as part of the Bean/Cowpea CRSP. Representatives of these U.S. institutions were recently brought together in yet another meeting to identify their specific research interests, to suggest others from their institutions who might also be available to participate and to familiarize them with what we at the Planning Office have learned from our own visits to various countries, the visit reports of the bean/cowpea research exploration teams, the previous meetings with LDC representatives held in this country, and the review of relevant literature. We now have a list of such persons, whose research areas and competence have been reviewed by U.S. and LDC scientists, who are interested in working with professional counterparts in Africa and Latin America.

It is our intention to send representatives of this U.S. group who are interested in East Africa or Latin America to the March legume meetings in Malawi or Guatemala respectively. At those meetings the U.S. researchers will be prepared to confer with LDC prospective collaborators about the specifics of the research design anticipated. At the conclusion of those meetings the U.S. researchers will be available to return with their counterparts to the countries where the research will take place. At that time they can review with their LDC colleagues the context of the research problems, the facilities and personnel available, and the specific requirements of the project to be written into the research design. It is anticipated that the U.S. researchers interested in West Africa will go directly to the appropriate countries for the same purposes. These trips will also take place in March. To facilitate this process and to assure that we send to you only persons whose professional expertise is most appropriate for your research requirements or who can represent such persons, we are enclosing herewith a set of materials for your review. We need your response to these materials as quickly as possible so that the necessary formal procedures for foreign travel of the appropriate persons to the March meetings can be completed. Clearly these procedures are faced with severe time constraints and early response is needed if this effort is to be successful.

Enclosed you will find several documents. The first is a general description of the Bean/Cowpea CRSP and its overall philosophy. We invite you to review it carefully and make comments if you wish. The second document is a set of general research topics and specific research items, by country. These have resulted from the country visits and meetings discussed earlier. Together they suggest the general global perspective of the CRSP. Unfortunately, there will not be adequate resources to do all the research suggested under the various research topics. Further culling and clarifying must yet be done. Additionally, the issue of duplication must be better resolved. Your contribution will be most helpful in this regard.

The third document, the extra long sheet, is a copy of the general research design as it emerged for the country you represent. We ask you to complete that sheet in the following manner and return it to us as quickly as possible. Look over the research items presented; if necessary you may add an additional one in the space provided at the bottom. Rank order them all in the Rank Column by giving the number 1 to the highest, most important item to be researched first, the number 2 to the next highest, and so on. Please understand that because of limited funding undoubtedly all the research items will not be funded. Therefore, in your ranking, it is necessary to consider what are the necessary next steps in meeting overall research goals. A research item appropriate as a next step in your program should be assigned the number 1 even though it is not necessarily the important long range research you and your colleagues wish to be doing in 5-10 years. Considering the state of knowledge, present facilities, and available personnel, the more advanced work might need to wait until the necessary resources can be built up. To assign top priority to research items where required resources are missing is to risk not being a part of the initial funding cycle. Please include your comments about the ranked items by number on the back of the same sheet. Additional sheets may be attached if you wish. We will carefully review your comments and rankings as we make preparations for the March visits.

231

We apologize for the length of this letter and the tasks which must be placed upon you. We are most concerned that the Bean/Cowpea CRSP be developed in a true atmosphere of collaboration, awkward though the initial stages of the collaboration may be. Your willingness to cooperate in this task is an essential ingredient in evolving a long-lasting, multi-cultural, research partnership among colleagues. It is our belief that such a partnership can be a valuable and rewarding experience, both personally and professionally, for all concerned. We look forward to such a relationship.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

M. W. Adams
Planning Officer
Bean/Cowpea Planning Program

PBM/MWA:kc

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING · MICHIGAN · 48824

We are delighted that you have agreed to represent the Bean/Cowpea CRSP in research design meetings with LDC scientists abroad. As you prepare for those meetings there are several items about which we need to communicate. These items are listed below with additional information attached as indicated.

1. You have agreed to visit the following country(ies) _____

Approximate dates during which you can expect to be away are _____
_____. Exact dates will be confirmed later.
2. Expenses (travel and per diem, but no salary) will be paid by the Bean/Cowpea Planning Office. We are making the travel reservations and room arrangements for you. Visa requests will be made through a visa service by our travel agent. She will be contacting you requesting completion of a visa form and asking you to send your passport to her to have it processed and stamped. You will need a number of small photos. USAID country clearances are also being requested by this office.
3. You must attend to your own health and personal needs. Please call your health department and begin getting your shots. Get your own allergy medication (if you take such), water purifier pills, anti-diarrhea medication, and any other pharmaceuticals you think necessary from your local pharmacy.
4. Your U.S. colleague, other than the representative of the Planning Office, will be _____ from _____
_____. A copy of your colleague's proposal is enclosed to give you an idea of the professional resources represented by this person. Your task will be to sit down with this person and your LDC counterparts and write a new joint research design in line with the needs and resources of all concerned. The Planning Office person will be there to help facilitate that process. It is hoped that you and your colleagues will be able to spend some time before the writing begins reviewing research sites, physical resources, and the overall context of the problem to be addressed.

A packet of country specific research topics is enclosed for your information. These are presently being modified by the potential LDC collaborators. If we're lucky, they will have the modified versions back to us in time for us to forward them to you before you leave.

5. One of your tasks will be to make out a summary budget sheet that includes the 25% contribution required of the U.S. institutions involved. Be prepared to be as accurate as possible. USAID has indicated that the allocation for the Bean/Cowpea CRSP for the first year will be around \$3,000,000 for the total program, including management entity costs. Because this low sum is being spread over approximately 14 countries, it is anticipated that the average total country Bean/Cowpea Title XII program should not exceed an average of approximately \$180,000 for the first year. The small countries' programs would appropriately be considerably smaller than the average. An average country research program budget might look as follows:

		<u>Expend in U.S.</u>		<u>Expend in LDC</u>
U.S. Institutions 25% Match	\$ 45,000	\$45,000		
Bean/Cowpea CRSP Funds	<u>135,000</u>	<u>45,000</u>		<u>\$90,000</u>
	\$180,000	= \$90,000	+	\$90,000

The total research program you write together, therefore, should be under this amount (\$180,000) for the first year. Included must be all training and travel costs.

6. We plan to compile the results of all our LDC meetings in time to present a global Bean/Cowpea CRSP plan to JRC at their May meeting. Since our planning grant time is over on June 30th, we must make that deadline. For that reason we are attempting to standardize all information collection tasks. With nearly 30 scientists travelling and most of us not getting back to the states until the first or second week in April, we really need your cooperation. You will be given the working forms to be used in your deliberations.
7. The objectives of these meetings are as follows:
 - a. To have representatives of all persons to be involved in the Bean/Cowpea collaborative research participating in the actual designing of that research.
 - b. To build a sense of comradeship among the scientists who will be working together.
 - c. To facilitate greater understanding by U.S. scientists of the research resources and the overall context of the problem to be researched.
 - d. To develop a sense of long range and short range objectives of the collaborative research, considered in the context of strengthening each institution's ability to address problems of world famine prevention.
 - e. To explore the range of production and non-production questions needing to be answered in addressing the identified problems.

- f. To identify specific colleagues who could appropriately be involved in the research activities.
- g. To write up a draft research design as indicated on the form and recommend it to the Planning Office for inclusion in the Bean/Cowpea CRSP plan.

Well, as you can tell, this is our largest undertaking to date. Your previous involvement has made the Bean/Cowpea CRSP an exemplary one, held in high regard by our Washington colleagues. The degree to which you carry out your mission efficiently and effectively will determine the extent to which we continue to enjoy good relations with JRC and BIFAD. It can also make a long term difference in your professional and personal life. Good luck, and have a safe and fruitful trip.

More information will be forthcoming from the Planning Office as appropriate. Should you have any dire questions or critical communications, feel free to call us at (517) 355-4693. If Wayne or myself is not available, just leave a message with Kay (the Planning Office secretary who keeps things moving).

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:kc

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

TO: The Consul Office of _____

FROM: _____
M. W. Adams
Bean/Cowpea Project Director

Listed below is the information required to obtain a _____
visa for _____.

_____ is a member of the faculty
of _____ at _____.

The purpose of the visit is to meet with USAID Mission personnel, the Ministry
of Agriculture and professional colleagues at various institutions to discuss
bean/cowpea agriculture, digestibility and use.

This visiting scholar will be in the country _____
(dates) _____.
The USAID Bean/Cowpea Project, Department of Crop and Soil Sciences, will guarantee
financial responsibility for this scholar whose contact person(s) is(are) listed
below.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

January 30, 1980

Dear Colleagues:

More communications from the planning office regarding your up-coming trip!

First, please remember that the trip you are about to take is as political as it is professional. If you do not show proper protocol relative to your host country and its government (usually the Ministry of Agriculture) you may not be allowed to do the work you develop with your collaborators. Governments usually have to approve all research which is to take place in their country. Further, USAID mission people have a great deal at stake in their relations with the host country government and have a lot invested in their full appreciation and respect for the local situation. To the extent that they can squeeze us into their on-going responsibilities I have found mission people to be very helpful. Especially is this true when one exhibits honesty, patience and mutual respect. Remember, country clearance comes from the mission and it can easily be denied (or delayed) if you are seen to be a problem.

Second, many of you have expressed an interest in knowing more about the host country so as to be able to communicate appropriately with host country nationals. With the help of the MSU African Study Center and Latin American Study Center the enclosed materials are made available to you as appropriate. Please read this material and let me know if there are any other materials or information you would find useful. Other material may be sent later.

Third, I'm sure everyone has a list of pet things not to forget when traveling in developing countries. The first rule of thumb is to travel light. It will be the usual case that you will have to carry your own belongings and perhaps for some distance (please leave the bag home with the zipper or catch that's about to go). Especially is this critical if you find yourself running to catch a plane that only flies once a week (and of course in such cases it is the only one there is). I like to travel with all my belongings in a backpack - especially after the following incident. Once in Africa, after arriving an hour and forty-five minutes early for a plane, I was told at the airport entrance that the plane was leaving an hour and a half early - was then boarding and about to take off. What about changing my country currency at the airport bank (you frequently are not allowed to take country currency out of the country)? What about customs? Well, when I saw the characteristic shrug of the shoulders, I nearly threw my currency at anybody who would take it and ran like O.J. through the necessary check points. Which way was the gate - which way!!? As they closed the plane doors behind me with the motors running, I breathlessly blessed the day back in East Lansing I had put back half the stuff I had laid out to take.

Enclosed is a packing check list of a very experienced friend of mine in International Studies. He admits there are a few trips where a tennis racket is

inappropriate, but being really into tennis he considers it any time he can. My own list of "things not to be forgotten" includes the items below.

- "Off" or "Cutters" (small lotion bottles, not spray)
- Fly swatter (metal handle which will bend, not plastic)
- Very small travel alarm clock
- "Wash and Dry" or "Wet Ones"
- Soap (that can be used for washing clothes as well as self) in plastic dish and/or liquid soap in small plastic bottle which can also be used easily for dishes
- Wash cloth in plastic bag

My daughter, who has traveled in Africa, prevailed upon me to take a few packages of dried soup and tea bags for emergencies (I also added granola bars).

Finally, KEEP BRUSHING UP YOUR LANGUAGE. Even if your facility is crummy, your attempt to struggle and learn even a little will mean a lot to your collaborator whom you are forcing to speak your language. Collaboration should mean you both contribute. That he or she is smarter than you is your problem. Acceptance of a need to work on learning the language will please your host. Would you believe - as pressured as Wayne Adams is, he is sitting in on a Spanish class every Tuesday night from 7-10! You too can sound like Ricardo Montalban or Brigitte Bardot or whomever!!!

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:bw

Enc.

23

Check Sheet for International Travel

Office

- calculator*
- letterhead
- multicarbon forms
- pens
- dictating machine*
- note paper*

- biz cards*
- personal photos*
- torch & batteries
- check book*
- work for enroute*
- paper clips, rubber bands
- envelopes
- address labels

TRAVEL*

- tickets
- cash
- traveller's checks
- health card
- eye glasses

- passport
- visas
- credit cards
- radio**
- extra eye glasses**

MEDICAL*

- malaria pills
- band aids
- Contac
- Kleenex
- nail clipper

- aspirin
- antiseptic
- ace bandage
- Lomotil

SHAVING*

- razor
- tooth brush
- comb
- deoderant
- shampoo
- soap
- sleep mask

- shave cream
- tooth paste
- blades
- foot powder
- Vitalis
- afta shave

CLOTHES

- suit(s)
- extra work trousers
- shorts (6)+(1)*
- socks (9)+(1)*
- ties
- country shoes

- suit bag
- shirts (6)+(1)*
- T shirts (6)+(1)*
- handkerchiefs (12)+(1)*
- slippers*
- city shoes

TENNIS

- racquets
- shoes
- clothes (A)

- balls
- extras
- clothes (B)

* = carry on

** = not carry on

239

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 1, 1980

Dear Colleagues:

You will all be pleased to learn that both foreign travel and foreign student training costs will be counted in your research against the "funds to be spent in host country" category. This information was confirmed by John Yohe, our AID liaison officer.

When I sent your U.S. representatives sheet out, Wisconsin still had not been able to get someone who could travel for this project. It has now been settled, however. Dr. Don Hagedorn, Department of Plant Pathology, 1630 Linden Dr., University of Wisconsin, Madison, WI 53706, will be going to Brazil and can be added to your list.

We have found that the Title XII Strengthening Grant funds can be used to pay host country students enrolled on our campus to tutor us. I now have a three hour lunch once a week with a Camaroonian student during which time we try to speak nothing but French (except for the numerous times things get hopelessly confused). If your University has received a Title XII Strengthening Grant you may want to check on this.

Ann at College Travel tells me she has mailed out all the visa request forms to everyone. Please get them back to her by return mail. Many countries are notoriously slow in granting visas. For you to be left here by the rest of the team because you took too long to return your form would be most unfortunate for everyone.

We are going to try to estimate your expenses (plane ticket will be pre-paid from here) on the basis of standard AID per diem for the countries in which you will be traveling. Based on that we will try to get issued to you a travel advance for 75% of the total. Save all receipts for everything and get your expense sheet back to us as soon as you return home. Since the grant will be over in June this must be taken care of quickly.*

Obviously you will need some money of your own. Should you have to spend any of it for allowed expenses you will be reimbursed. Kay (the Planning Office secretary) is making up a sheet to give you information on allowed expenses which you should receive soon. This whole expedition for 24-25 scientists going to 14-15 countries is tremendously expensive. Going luxury class is not only impossible but also ridiculous given our overall mission. At each choice point remember Uncle Sam is getting more and more tight-fisted and all financial decisions must be justifiable or they may not be reimbursed.

Enclosed is an interesting communication exchange between Thomas Sanders of the

American Universities' Field Staff (AUFS), to which Michigan State University belongs, and Wayne. While none of you is going to Mexico, our information suggests that the situation presented here is not a-typical throughout the 3rd world. If you're not a hard-nosed realist, this material is especially important for you. Based on this, we can have some interesting discussions regarding our own input when we get together.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

* P.S. Although the extended grant has not yet been awarded, it was approved by JRC at their January meeting. It's presently working its way through the Washington structure and we hope will be approved soon. There is always the chance, however, that none of us will be going anywhere.

PBM:bw

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 4, 1980

TAKE THIS MATERIAL WITH YOU
WHEN YOU TRAVEL.

TO: Persons travelling for the Bean/Cowpea Planning Program

FROM: Kay Carter, Secretary, Office of Bean/Cowpea Planning Program

RE: Instructions for getting reimbursement for travel expenses

Carefully study the enclosed copy of the Memorandum regarding foreign travel from Howard G. Grider, Director of the Contract and Grant Administration here at Michigan State University and the attached sample Travel Voucher.

Keep:

1. Receipts of directly reimbursable bills, such as:
 - A. Hotel bills
 - B. Taxis--for business purposes (Not to go to a restaurant from your hotel. Per diem should cover this.)
 - C. Tourist cards
 - D. Airport taxes
 - E. Others you think applicable
2. Your complete airline ticket stub (receipt). Your air ticket fare will be pre-paid by the College Travel agency here in East Lansing but the complete ticket receipt must be submitted with your travel voucher showing your expenses.
3. Your travel itinerary (the one furnished by the travel agency). Note any changes such as other cities visited, and departure and arrival times. Also note any trips by car, showing cities visited, and departure and arrival times.
4. A daily chronologically ordered record on which all reimbursable receipts are recorded, using the outline on page 2. Note on each receipt the exchange rate for the country in which it is used. To avoid confusion, each individual should pay for his own expenses only. If it is necessary to pay for the expenses of a fellow traveller at any time, both parties should so note on the expense sheet.

PLEASE SUBMIT YOUR EXPENSES AND RECEIPTS TO THE PLANNING OFFICE IMMEDIATELY UPON YOUR RETURN.

PLEASE RECORD YOUR DIRECTLY REIMBURSABLE EXPENSES DAILY AS FOLLOWS:

No.	<u>Date</u>	<u>Paid to What Agency</u>	<u>Purpose</u>	<u>City & Country</u>	<u>Exchange Rate Units/US Dollars</u>	<u>Amount in Foreign Currency</u>	<u>Amount in American Money</u>
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							

*PLEASE WRITE THIS NUMBER ON EACH CORRESPONDING RECEIPT.

242

MICHIGAN STATE UNIVERSITY

OFFICE OF THE VICE PRESIDENT FOR BUSINESS AND FINANCE
CONTRACT AND GRANT ADMINISTRATION
TELEPHONE (517) 355-5010

EAST LANSING • MICHIGAN • 48824

March 14, 1979

MEMORANDUM

TO: Deans, Directors and Department Chairpersons
FROM: Howard G. Grider, Director
SUBJECT: Foreign Travel

I Definition

MSU travel regulations consider travel as foreign when the destination is outside the United States, Canada, Alaska, Hawaii or Puerto Rico. However, when travel is supported by a U.S. Government contract or grant it is necessary to examine that document to determine what is defined as foreign travel. It is recommended that the Office of Contract and Grant Administration be consulted when such foreign travel is contemplated.

II Tickets

Normally, travel should be on American Flag carriers, by the most expeditious route and at less than first class rates. When travel is to be charged to a grant or contract it should be reviewed for restrictions and exceptions to the normal University travel regulations.

Tickets may be ordered through a travel agency or airline and paid directly from the grant or contract account. Travel advances are not given to staff members to cover international or foreign fares, but are intended to provide for per diem, internal travel and miscellaneous enroute costs.

III Per Diem

The per diem in lieu of subsistence expenses includes all charges for meals, lodging, personal use of room during daytime, baths, all fees and tips to waiters, porters, baggagemen, bellboys, hotel maids, dining room stewards, and others on vessels, hotel servants in foreign countries, telegrams and telephone calls reserving hotel accommodations, laundry, cleaning and pressing of clothing, fans and fires in rooms, and transportation between places of lodging or business and places where meals are taken. The term "lodging" does not include accommodations on airplanes, trains, or steamers, and these expenses are not subsistence expenses.

Receipts for lodging should be secured to comply with the new income tax laws.

For travel outside the conterminous United States, reimbursement for each per diem locality will be the average cost of lodging rounded to the next whole dollar plus 50 percent of the maximum locality rate. Total reimbursement shall not exceed the maximum per diem for each locality, unless specific approval is given in advance for actual expenses. Maximum locality rates shall be those established by the Department of State for foreign areas.

III Per Diem continued

Per diem is computed on a daily basis with the day divided into four quarters. They are: midnight to 6:00 a.m., 6:00 a.m. to noon, noon to 6:00 p.m., and 6:00 p.m. to midnight.

The international rate is used for the time enroute for foreign destinations. It is also used for travel between foreign locations when the total time enroute exceeds a full quarter. This rate is \$6.00 per day. Foreign countries are assigned a daily rate by the U.S. State Department, subject to review and change every month. This information is available in the Office of Contract and Grant Administration.

When a staff member leaves his residence on a foreign assignment, the international per diem rate is effective the quarter of a day during which he leaves. This rate continues through the end of the quarter of a day in which he arrives at a location where he will remain for at least the next full quarter.

The rule is that the rate in effect at the beginning of a quarter applies through the end of the quarter in which a change takes place.

When either meals or lodging are furnished without charge, the per diem claim should be reduced by 50 percent. This applies to "in-country" not "international" per diem.

If a staff member travels by an indirect route for personal reasons, per diem will normally be paid only for the time it would take to travel by the most expeditious route.

IV Travel Vouchers

The attached voucher has been prepared for a hypothetical trip and is an example of how a travel voucher should be submitted. In processing travel vouchers there are a number of items which should be noted:

If a travel advance was secured by the staff member, the voucher may be payable to "MSU for the account of _____."

The travel authorization and travel voucher should agree as to the account number or numbers to be charged and the purpose of the trip as well as the countries which will be visited.

If more than one account number is to be charged, the various costs claimed should be marked to indicate the appropriate account. Ticket stubs and receipts for expenses claimed should be attached to the voucher and any foreign currency exchange rate used should be noted.

In case of indirect routing for personal reasons, the extra transportation costs should be at the traveler's expense and the additional time should be charged as vacation.

University general funds cannot be used for foreign travel unless specified for that purpose. Please refer to MSU Travel Regulations dated July 1, 1977, page 8, # VIII and page 21, # XVIII.

International airfare should not be charged on the travel voucher if it has been paid to the travel agency or airline directly. However, there may be some incidental travel which could not be anticipated before the staff member left for overseas. All ticket stubs must be attached to the

IV. Travel Vouchers continued

voucher even though the air fare was prepaid. Ticket stubs are ~~necessary~~ to provide audit documentation to cover the prepayments to travel agencies. Receipts for lodging should also be attached to the travel voucher, along with any other documentation available for verifying expenses.

Taxi expenses are allowable for travel related to business. For example, taxis to and from hotel to airport and taxis from hotel to a business meeting are allowable. Taxis from hotel to a restaurant to eat a meal, or taxis for sightseeing trips are not allowable.

Please note in the sample voucher that time of departure and arrival are directly opposite the amount claimed for per diem.

It is requested that you distribute this information to any individuals involved in foreign travel.

Any questions regarding this subject should be directed to the Office of Contract and Grant Administration.

bw

Attachment

246

SAMPLE

- 235 -

MICHIGAN STATE UNIVERSITY TRAVEL VOUCHER

Distribution

- White - Comptroller's Office
- Green - Return to department with the voucher number
- Yellow - Voucher audit
- Blue - Mail to traveler with the check

- 1. Prepare with typewriter in quadruplicate.
- 2. Refer to the University Travel Regulations for correct preparation.
- 3. Submit white, green, yellow and blue copies to the Comptroller's Office.
- 4. For out-of-state travel submit to Office of the Provost.

Page 1 of 3

*Name Jane Doe

Dept. Int'l Studies & Programs

Mailing Address (if other than to Dept.) _____

ACCOUNT TO BE CHARGED

Department Int'l Studies & Programs

Account No. 71-9999

Account Name Nepal Project

Purpose of Trip: Short-term Consultant in Nepal, performing administrative services under the above contract, AID/ta-C-0000

- *If check is to be deposited in your bank, precede name with (name of bank) for the account of
- *If check is to be sent to MSU Cashier to apply on advance, precede name with Mich. State Univ. for the account of

This column is for complete itemization of travel.

SUBSISTENCE and MISCELLANEOUS

Br - Breakfast Lu - Lunch Di - Dinner
Lo - Lodging M - Miscellaneous

DATE	STARTING POINT	DESTINATION	Manner of Travel MILEAGE	RATE	AMOUNT	DATE	AMOUNT
978						1978 8/27	M - inoculations 4.00
9/15	E.Lansing	airport	Auto 10 mi	.17 .19	1.70 1.90	9/14	M - inoculations 2.00
9/15	Lansing					9/15	Int'l per diem 2/4 @ \$6 3.00
9/16		0810 London				9/16	2/4 @ \$6 3.00
9/17	0900 London					9/15	London per diem 2/4 @ \$82 41.00
						9/17	2/4 @ \$82 41.00
9/18		0130 Delhi				9/17	In'l per diem 2/4 @ \$6 3.00
9/18	0730 Delhi	0855 Kathmandu				9/18	1/4 @ \$6 1.50
						9/18	Delhi per diem 1/4 @ \$30 7.50
						9/18	Kathmandu per diem 2/4 @ \$40 20.00
9/19	1630 Kathmandu	1730 Rampur				9/19	3/4 @ \$40 30.00
						9/19	Rampur per diem 1/4 @ \$12.50 3.13
						9/20- 9/25	6 days @ \$12.50 75.00
Travel Sub-Total						\$	
						Subsistence and Misc-Sub-Total	
						\$	

HEREBY CERTIFY that this claim is correct and reimbursable under published travel regulations of Michigan State University.

SIGNED: _____
Traveler's Signature

DATE: _____

APPROVED BY:

Department Chairman

Dean or Director

Travel Sub-Total	\$
Total Claim	\$

Check Date	Check No.	Voucher No.
------------	-----------	-------------

MICHIGAN STATE UNIVERSITY
 TRAVEL VOUCHER ²³⁶

Distribution

- White - Comptroller's Office
- Green - Return to department with the voucher number
- Yellow - Voucher audit
- Blue - Mail to traveler with the check

- 1. 3 with typewriter in quadruplicate.
- 2. Refer to the University Travel Regulations for correct preparation.
- 3. Submit white, green, yellow and blue copies to the Comptroller's Office.
- 4. For out-of-state travel submit to Office of the Provost.

*Name <u>Jane Doe</u> Dept. <u>Int'l Studies & Programs</u> Mailing Address (if other than to Dept.) _____	ACCOUNT TO BE CHARGED Department <u>Int'l Studies & Programs</u> Account No. <u>71-9999</u> Account Name <u>Nepal Project</u>
--	--

Purpose of Trip: <u>Short-term consultant in Nepal, performing administrative services under the above contract, AID/ta-C-0000</u>	* If check is to be deposited in your bank, precede name with: (name of bank) for the account of * If check is to be sent to MSU Cashier to apply on advance, precede name with: Mich. State Univ. for the account of
--	--

This column is for complete itemization of travel.

SUBSISTENCE and MISCELLANEOUS										
						Br - Breakfast	Lu - Lunch	Di - Dinner		
						Lo - Lodging	M - Miscellaneous			
DATE	STARTING POINT	DESTINATION	Manner of Travel MILEAGE	RATE	AMOUNT	DATE			AMOUNT	
9/26	1400 Rampur	1500 Kathmandu				1978 9/26	3/4 @ \$12.50		9.39	
						9/26	Kathmandu per diem 1/4 @ \$40		10.00	
						9/27- 9/29	3 days @ \$40		120.00	
9/30	1630 Kathmandu	1730 Rampur				9/30	3/4 @ \$40		30.00	
						9/30	Rampur per diem 1/4 @ \$12.50		3.13	
						10/1- 10/2	2 days @ \$12.50		25.00	
10/3	0630 Rampur	1330 Kathmandu	auto		N/C	10/3	3/4 @ \$12.50		9.39	
						10/3	Kathmandu per diem 1/4 @ \$40		10.00	
10/4	1600 Kathmandu	1710 Delhi				10/4	3/4 @ \$40.		30.00	
						10/4	M - airport tax		3.36	
						10/4	Int'l per diem 1/4 @ \$6		1.50	
						10/5	Delhi per diem 1/4 @ \$30		7.50	
						10/5	Int'l per diem 2/4 @ \$6		3.00	
Travel Sub-Total						\$				
							Subsistence and Misc-Sub-Total		\$	

I HEREBY CERTIFY that this claim is correct and reimbursable under published travel regulations of Michigan State University.	APPROVED BY: _____ Department Chairman _____ Dean or Director	Travel Sub-Total \$ Total Claim \$
SIGNED: _____ Traveler's Signature		
DATE: _____		

Check Date	Check No.	Voucher No.
------------	-----------	-------------

SAMPLE

MICHIGAN STATE UNIVERSITY
TRAVEL VOUCHER

Distribution

- White - Comptroller's Office
- Green - Return to department with the voucher number
- Yellow - Voucher audit
- Blue - Mail to traveler with the check

are with typewriter in quadruplicate.
air to the University Travel Regula-
tions for correct preparation.
Submit white, green, yellow and blue
copies to the Comptroller's Office.
For out-of-state travel submit to Office
of the Provost.

<p>Name <u>Jane Doe</u></p> <p>Dept. <u>Int'l Studies and Programs</u></p> <p>Mailing Address (if other than to Dept.) _____</p>	<p>ACCOUNT TO BE CHARGED</p> <p>Department <u>Int'l Studies & Programs</u></p> <p>Account No. <u>71-9999</u></p> <p>Account Name <u>Nepal Project</u></p>
<p>Purpose of Trip: <u>Short-term consultant in Nepal, performing administrative services under the above contract, AID/ta-C-0000.</u></p>	

*If check is to be deposited in your bank, precede name with: (name of bank) for the account of
*If check is to be sent to MSU Cashier to apply on advance, precede name with: Mich. State Univ. for the account of

This column is for complete itemization of travel.

SUBSISTENCE and MISCELLANEOUS
Br - Breakfast Lu - Lunch Di - Dinner
Lc - Lodging M - Miscellaneous

DATE	STARTING POINT	DESTINATION	Manner of Travel MILEAGE	RATE	AMOUNT	DATE	AMOUNT	
10/6	1115 London	1930 Lansing	Air	RT	*	1978 10/5	London per diem 1/4 @ \$42	10.50
10/6	airport	E.Lansing	Auto 10 mk	.15	1.50	10/6	2/4 @ \$42	21.00
						10/6	Int'l per diem 2/4 @ \$6	3.00
<p>air fare paid on DPV #123456 dated 9/15/78 to Abe's Travel Agency.</p>								

PER DIEM CALCULATIONS		NON-LODGING		AVERAGE ALLOWABLE	
DATE	LOCATION	CURRENT RATE	ALLOWABLE (50% of RATE)	LODGING (1)	P.D. RATE
9/16	London	\$84	\$42	\$40 (2)	\$82
9/18	Delhi	\$60	\$30	\$-0- (3)	\$30
9/18	Kathmandu	\$40	\$20	\$23	\$40
9/19	Rampur	\$15	\$7.50	\$5	\$12.50
10/4	Delhi	\$60	\$30	\$-0- (3)	\$30
10/5	London	\$84	\$42	\$-0-	\$42

EXPLANATORY NOTE
 (1) Actual cost per receipts raised to next whole dollar.
 (2) Actual cost per receipt amounted to \$30.75
 (3) No cost for lodging, stayed with friends.

Travel Sub-Total \$ 3.00 Subsistence and Misc-Sub-Total \$ 530.90

I HEREBY CERTIFY that this claim is correct and reimbursable under published travel regulations of Michigan State University.

SIGNED: _____
 Traveler's Signature

DATE: _____

APPROVED BY: _____
 Department Chairman

 Dean or Director

Travel Sub-Total \$ 3.00
 Total Claim \$ 533.90

Check Date	Check No.	Voucher No.
------------	-----------	-------------

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

Enclosed please find host country response to the research priorities questions (on LDC Collaborators Evaluation Sheet of Country Research) sent them in January.

Please review carefully as this information becomes the basis on which you start discussions and research negotiations. Note also the persons involved in this deliberation as indicated at the bottom of the form.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:kc

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 12, 1980

Dear Colleagues:

Yet another communication from the planning office - (we have high hopes).

On the travel - remember to fill out all documents relative to the countries you are visiting as a tourist. I realize there are temptations to indicate "business" on the forms since we all take ourselves quite seriously. But "business" generally means commercial business to these governments and we are not going to transact any of that. To avoid misunderstandings and being held up needlessly, always identify yourself as a tourist meeting with USAID mission people and University colleagues.

For some of you receiving this letter there are additional readings enclosed for your edification!

At this writing the word from Washington is that the grant looks positive. We expect to hear of the critical signature having been received on it by Friday (February 15). Since I am to leave with the first group of you on the 26th, this really is running it close to the wire. But then, what else is new!

Those of you who have been writing I really appreciate it. Your written comments become part of our data bank and to the extent that they identify helpful aspects of the procedures they are very useful. Obviously constructive criticism is also important.

The last enclosure is a very important work document. Entitled "Joint Research Outline", it is a copy of the outline which you and your host country colleagues will be working on together. Study it carefully and if you have any questions call us right away. Additional copies will be sent to you later.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:bw

Enc.

INSTRUCTIONS FOR COMPLETING JOINT RESEARCH OUTLINE

This meeting is the initial effort between host country and U.S. scientists jointly writing a draft of important research they might undertake together which will strengthen some aspect of bean/cowpea production or consumption. Because of the complexity of bringing together two or more institutions representing (1) several sets of institutional directions, (2) different governmental priorities, and (3) a variety of individual professional interests, it should be clear that the agreements here are initial drafts. They must be reviewed by various officials. The proposal outlines should represent the resources of the actual researchers in the field reflecting the needs of the people of the host country for whom the research is to be done. Subsequently these research outlines must be (1) put into a global plan that can be recommended by the B/C planning office, (2) accepted by the involved institutions, and (3) ultimately approved by the appropriate offices of the respective governments. At any point in this process a country or an institution or a particular researcher active in the planning efforts may find further involvement inappropriate or discontinued.

The Joint Research Outline should reflect in its development the following USAID concerns:

1. Address attention to the non-production aspects as appropriate, as well as to the production aspects of a particular problem. U.S. and host country non-production persons should be identified as collaborators in a well developed plan. This refers in particular to the social, cultural or economic context of the identified problem.
2. Emphasis is to be placed on the needs of the small subsistence farm in the identification of specific research problems. This means that the research designs must include sites in traditional settings or in settings comparable in multiple respects to the traditional subsistence farms. Additionally, methods of feeding communications into the research from the subsistence farms should be indicated.
3. Approximately one-half of the total proposed budget must be spent in or on behalf of the host country (host country students in the U.S. and researcher travel included in this latter category). The total proposed budget includes both the Title XII appropriation and the U.S. institution matching funds (does not include any host country contribution).
4. Because of the active participation (sometimes exclusive participation) of women in bean/cowpea production as well as consumption, including marketing, attention should be paid to their needs and involvement in the program. Indicate the extent to which this is anticipated.
5. Documentation of the need for the proposed research should be appended if available or forwarded to the planning office soon after the joint meetings. Appropriate interviews as well as published materials may be part of that documentation.

Additional comments may be written on the back of the document if desired. There should be only one project per country. Since division of monetary resources will be calculated by country, recommending more than one project will mean a division of the amount apportioned to that country.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 21, 1980

Dear Colleagues:

Yet another communication from the planning office.

On the travel - remember to fill out all documents relative to the countries you are visiting as a tourist. I realize there are temptations to indicate "business" on the forms since we all take ourselves quite seriously. But "business" generally means commercial business to these governments and we are not going to transact any of that. To avoid misunderstandings and being held up needlessly, always identify yourself as a tourist meeting with USAID mission people and University colleagues.

For some of you receiving this letter there are additional readings enclosed for your edification!

Those of you who have been writing I really appreciate it. Your written comments become part of our data bank and to the extent that they identify helpful aspects of the procedures they are very useful. Obviously constructive criticism is also important. Please forward to me copies of all correspondence with travel colleagues and potential LDC collaborators. All of this information will be supportive when we present the global plan to JRC.

The last enclosure is a very important work document. Entitled "Joint Research Outline", it is a copy of the outline which you and your host country colleagues will be working on together. Study it carefully and if you have any questions call us right away. Although the planning office representatives will have a few copies, it would be wise for you to take your copies with you.

We are coming right down to the wire with the grant. As of February 20, 1980, AID agreed to fund our proposal on a month-by-month basis. This requires submitting a budget by the first of each month for funds for the next month. Obviously, since we're all traveling budgets must be done in advance. Nonetheless, for your purposes all should work out with no inconvenience to most of you. Those of you planning to leave for Nigeria on February 26 are running close but I am still in hopes of having the funds released by Washington in time. Talk to me (351-6512 - home) or (355-4693 - office) on Monday, February 25.

Those of you going to the Malawi conference know by now that Malawi changed its mind--(seven American observers will not be too many) so the trip is on again. Immigration officials at the Port of Entry require a letter of invitation. Enclosed is a letter that may do, if the one we have requested with each of your names on it does not get through in time. Please take it with you. We should all arrive at the same time but there may be a slip.

Luck and a good and productive journey to all -

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 25, 1980

TO: Travelling U.S. Scientists
FROM: Pat Barnes-McConnell, Bean/Cowpea Planning Office
SUBJECT: Travel procedures

Attached is a list of cities with the respective place of accommodation indicated. You must get from the airport to your hotel yourself. Ask airport officials for public transportation possibilities to your hotel, or if none available take a cab. In some cities cabbies are real husslers--use them as a last resort. At any rate, know the price before driving off.

Also attached is the list of contact persons for each country and their addresses.

During the regular work hours immediately following your arrival call the U.S. AID mission and ask for the person listed on your contact sheet (or his replacement). In at least one instance there has been a change in personnel since our communications began. (Trinidad people use Dr. John Spence, Dean of the College of University of West Indies, who sent a cable that he is expecting you. Phone # 662-7161/5. Inquire if, when and where meetings with the other contact people have been arranged. If none have been, you will have to get in touch with the other contact people yourself. They have been receiving communications from us and should be expecting you. Make sure you also meet with the Mission people either at the same time as the host country scientists or separately. The Mission people will give you valuable information about the state of relevant research in that area and the political/social climate in which you must operate.

Remember, both in the case of the Mission people and the host country representatives--they are doing you a favor to adjust their routines to your schedule and your need to discuss research. Donor agency people come through all the time and usually with a lot more money than we will have. Some help, some do nothing much except waste time, and others actually leave things in worse shape than before they arrived. Therefore, a certain amount of cynicism and perhaps disinterest should be expected and respected. We are on their turf. Realistically, each of us is expecting to get something out of all this for ourselves, but the mutuality may not be apparent to all at first blush. You will be a diplomat--hopefully, a good one. Vigorously guard against being impatient, arrogant or condescending, either subtly or overtly. Think of how you would expect to behave if they showed up at your busy office and wanted to initiate joint research with you on their terms with a little bit of their money. Interesting feeling, isn't it!

In your talks with host country persons emphasize:

1. While there is not much money, at least initially, one of the biggest advantages of the program is the collaborative linkages among institutions which the U.S. and host country scientists should find invaluable over the years.
2. Make no promises. We are there to see if (1) the research they want to do (and to which they will make a commitment) matches with (2) the research our people want to do (and are capable of doing) in a way that (3) facilitates the overall global research plan in beans or cowpeas. You are there to help make the first two assessments. The final one, relative to appropriateness within the global context, can only be made when the data from all the visits are in. Your job is an extremely important one.
3. We are very concerned about training and assisting the host government build its research capabilities. If the host country appears interested in training, ascertain the extent to which women can be expected to be involved. Similar information should be obtained regarding the research proposed.
4. While changes in the Joint Research Outline can be suggested later, a completed outline must return with the Planning Office representative. The global plan with the matched countries, institutions, and researchers must be completed by the end of April for distribution and subsequent approval by JRC. The absence of a documented report from a country will have to mean automatic exclusion, at least at this point.

When preparing to leave a country, call or stop by the airline office the day before and the day of departure to confirm your reservation and the plane's schedule. Change your country money back but maintain enough for airport tax--the fee you pay at the airport to get out. Check on entry to find out what this is.

Remember before you begin this trip, send the Planning Office copies of all correspondence regarding this project. Part of our report will be the extent to which such communications took place, were necessary, and were useful.

For your health, we advise eating no raw vegetables and eating only peeled fruit. We suggest drinking only bottled beverages or beverages using well boiled water such as tea or coffee--this includes brushing your teeth.

Upon your return home an anecdotal report and analysis of your trip is expected. While we have not prepared a form for this, the information will be very important in our subsequent efforts. Everything should be in this office by the 15th of April: report, travel expenses accompanied by ticket stub (even if prepaid), etc. Planning Office staff will hit the ground running after the trips with a JRC meeting the first week in April followed by a series of other official meetings and reports thereafter. We must rely on you to keep our pace!

Within the time we had, we have attempted to make this effort as efficient and smooth-flowing as possible. Undoubtedly, with 25 people from 12 institutions going to 15 different countries all at the same time, there are bound to be some hitches. If we're lucky, and patient, and use forethought maybe they can be kept to a minimum. From all we can tell, this is a model of collaboration that hasn't been tried before--a lot is riding on your efforts. From national and international comments received, we know that Washington and others are watching. Good luck!

Encs: (1.) Hotel list (2.) Contact persons list.

CITIES/HOTELS

Nairobi - New Stanley Hotel

Dar es Salaam - Agip Hotel

Lilongwe - Capital Hotel

Cities in Nigeria - Indicated Contact Persons making arrangements - responses not yet received

Ouagadougou - L'Independance

Santo Domingo - Lopez-Rosa to make own arrangements

Quito - Peter Gore (Cornell) on site making arrangements, will return with information by 3/1/80

Trinidad - Belaire Hotel, at airport, Port of Spain

Guyana - Hotel Pegasus, Georgetown

Brazil - Dr. Blumenschein (EMBRAPA) on site, making arrangements check at Guatemala meeting, with Dr. Adams

Costa Rica - Balmoral Hotel, San Jose

Guatemala City - Dorado Americana

Tegucigalpa - Freytag to make own arrangements

Yaounde - L'Independance, Terminus Hotel

Dakar - L'Independance

256

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 25, 1980

TO: Travelling U.S. Scientists
FROM: Kay Carter, Secretary, Bean/Cowpea Planning Program
SUBJECT: Travel Advance

We assume by this time you have received a copy of your travel schedule and know where you are going and when.

Your travel advance is being estimated according to per diem rates in the locations (overnight) shown on your travel schedule. In most cases the travel advance will be 75% of the total estimated per diem (based on overnight stays).

It is suggested that you take at least the 25% above the advance to take care of unexpected expenses, although when possible a Planning Office person (Dr. M. W. Adams, Dr. Pat Barnes-McConnell, Dr. Donald Wallace, or Ms. Dora Lodwick) will be present to assist in cases of emergency.

Per diem amounts pertinent to your trip are listed on the following page.

IMPORTANT: See my memo dated February 4th and attachments to see how foreign travel is figured, reimbursement for expenses, etc.

Enc.: Per diem list

P.S. Your travel advance will be forthcoming as soon as available.

MSU is an affirmative action/equal opportunity institution.

PER DIEM LIST FOR SCIENTISTS GOING TO AFRICA

<u>Location</u>	<u>Per diem amount</u>
Enugu, Nigeria	\$93
Jos, Nigeria	93
Ibadan, Nigeria	93
Blantyre & Lilongwe, Malawi	60
Dar es Salaam, Tanzania	56
Nairobi, Kenya	55
Dakar, Senegal	82
Ouagadougou, Upper Volta	76
Yaounde, Cameroon	70
Paris, France	96

PER DIEM RATES FOR SCIENTISTS GOING TO LATIN AMERICA

Guatemala City, Guatemala	48
Panama City, Panama	50
Fortaleza, and Goiania, Brazil	55
Port of Spain, Trinidad	72
Georgetown, Guyana	55
Quito, Ecuador	58
Cali, Colombia	52
San Jose, Costa Rica	49
Santo Domingo, Dominican Republic	59

25

KENYA

Mr. Kenneth Eubanks
Agricultural Division Officer
USAID Nairobi
Agency for International Development
Department of State
Washington, D.C. 20523

Dr. C. N. Karue, Dean
Faculty of Agriculture
University of Nairobi, Kabete Campus
Nairobi, KENYA

Dr. D. M. Mukanya
Faculty of Agriculture
Univ. of Nairobi, Kabete Campus
Nairobi, KENYA

Dr. B. M. Muruli
Faculty of Agriculture
Univ. of Nairobi, Kabete Campus
Nairobi, KENYA

Dr. D. I. Gomez
Faculty of Agriculture
Univ. of Nairobi, Kabete Campus
Nairobi, KENYA

TANZANIA

Dr. John Anania
Agricultural Development Officer
USAID Dar es Salaam
Agency for International Development
Dept. of State
Washington, D.C. 20523

cc: Dr. Paul Duffield
USAID Dar es Salaam
Agency for International Development
Dept. of State
Washington, D.C. 20523

Dr. John Liwenga - AIR MAIL
Chief of Research
Ministry of Agriculture
Dar es Salaam, TANZANIA

Dr. B. Nduguru, Head - AIR MAIL
Dept. of Crop/Soil Sciences
University of Dar es Salaam
Faculty of Agriculture
Morogoro, TANZANIA

MALAWI

Ms. Vivian Anderson
USAID Lilongwe
Aid for International Development
Department of State
Washington, D.C. 20523

Dr. O. T. Edge
University of Malawi
Bunda College of Agriculture
P. O. Box 219
Lilongwe, MALAWI

Dr. L.K. Mughogho, Head
Crop Protection Department
University of Malawi
Bunda College of Agriculture
P. O. Box 219
Lilongwe, MALAWI

NIGERIA

Professor Oyediran - sent direct-AIR MAIL
Dept. of Preventive and Social Medicine
University of Ibadan
Ibadan, NIGERIA

Professor Alfred Ikeme - sent direct-AIR MAIL
Dean, Medical Sciences
University of Jos
Jos, Nigeria
Dr. Azuka Dike, Dept. Sociology/Anthropology
University of Nigeria, Nsukka, Nigeria

UPPER VOLTA

Mr. Richard Meyer
Director of Agriculture
USAID Ouagadougou
Agency for International Development
Department of State
Washington, D.C. 20523

Mrs. Sandwidi, Head
Service de la Recherche Agronomique
Direction des Services Agricoles
Government of Upper Volta
Ouagadougou, Upper Volta

CAMEROON

Mr. Eric Witt, Agricultural Officer
USAID Yaounde
Agency for International Development
Dept. of State
Washington, D.C. 20523

Dr. Owen Gwathmey, Agronomist
SAFGRAD Project
Maroua, Cameroon

DOMINICAN REPUBLIC

Mr. Eric Shearer
Agricultural Economist
USAID Santo Domingo
Agency for International Development
Dept. of State
Washington, D.C. 20523

Mr. J. Diaz
Ministry of Agriculture
Santo Domingo, Dominican Republic

Dr. A. Villanueva
Ministry of Agriculture
Santo Domingo, Dominican Republic

Mr. Freddy Saladin
Ministry of Agriculture
Santo Domingo, Dominican Republic

Dr. Antonio M. Pinchinat
IICA - Instituto Interamericano de Ciencias
Agrícolas de la Oea
Apartado 711

Santo Domingo, Dominican Republic

Dr. William Jansen
Rural Development Officer
USAID Tegucigalpa
APO Miami, Florida 34022

Dr. Simon Nalo, Director
School of Agriculture
Zamorano, Honduras

Dr. Contrera, Research Director
Honduras Ministry of Agriculture
Tegucigalpa, Honduras

SENEGAL

Mr. James H. Livingston
Agricultural Officer
USAID Dakar
Agency for International Development
Dept. of State
Washington, D.C. 20523

Mr. Cheney Frederickson
Regional Project Director
Sahel Food Crop Protection Project
USAID Dakar
Dakar, Senegal

Dr. L. Sauger, Director
Institut Senegalais de la Recherche Agricole (ISRA)
Dakar, Senegal

Mrs. Basse, Director General
Institut de Technologie Alimentaire (ITA)
Dakar, Senegal

Mr. Decoene
Societe de Development et de
Vulgarisation Agricole (SODEVA)
Dakar, Senegal

BRAZIL

Mr. Frank Campbell*
US 0 Brasilia
Agency for International Development
Dept. of State
Washington, D.C. 20523

Dr. A. Blumenschein, Chief
EMBRAPA - CNPAP
Centro Nacional De Pesquisa
Parra Arroz E. Feijao
BR-153 KM 4
CAIXA POSTAL 179
74.000 Goiania, Goias, Brazil

Dr. R. J. Guazzelli, Assoc. Chief, Technical
EMBRAPA - CNPAP
Centro Nacional De Pesquisa
Parra Arroz E. Feijao
BR-153 KM 4
CAIXA POSTAL 179
74.000 Goiania, Goias, Brazil

Dr. Eric Watt
International Institute of
Tropical Agriculture
Goiania, Goias, Brazil

Rector
Universidade Federal da Bahia
Rua Augusto Viana S/NO
40.000 Salvador, Bahia, Brazil

Dr. Renato Pino Pereira, Director
EPABA
Caixa Postal 1222
40.000 Salvador, Bahia, Brazil

Dr. Clibas Vieira
Professor of Agronomy
Universidade Federal De Vicosa
36.570---VICOSA---MINAS GERAS, BRAZIL

*Mr. Campbell no longer in Brasilia
Contact Samuel Taylor
Social Development Attache
American Embassy, Brasilia

COSTA RICA

Dr. Robert Mowbray
Food/Agricultural Officer
USAID San Jose
APO Miami, Florida 34020

Dr. Ronald Echandi
University of Costa Rica
San Jose, Costa Rica

Dr. Eduardo Jimenez
University of Costa Rica
San Jose, Costa Rica

GUATEMALA

Mr. Carl Koons
USAID Guatemala
APO Miami, Florida 34024

Ing. Ramiro Ortiz, Director General
I.C.T.A.
Galerias Espana - 50 Piso
72 Av. No. 11-59, Zona 9
Guatemala City, Guatemala

Dr. Porfirio Masayu
I.C.T.A.
Galerias Espana - 50 Piso
7a Av. No. 11-59, Zona 9
Guatemala City, Guatemala

Dr. Riccardo Bressani
I.N.C.A.P.
Guatemala City, Guatemala

ECUADOR

Mr. Vincent Cusumano
Cultural Development Officer
USAID Quito
APO Miami, Florida 34039

Mr. Joseph J. Sconce
Mission Director
USAID Quito
APO Miami, Florida 34039

Srda. Flor Maria Sanchez de Arteaga
Director of Home Economics Section
Ministerio de Agricultura y Ganaderia
Calle Guayaquil 1740
Quito, Ecuador

Dr. Jerry Grant
IADS
Edificio Banco Internacional
Oficina 12.3-12.4
Casilla 495.A
Quito, Ecuador

Ing. Cesar Chiriboga
Head of Legumes Program
I.N.I.A.P.
Apartado 2600
Quito, Ecuador

TRINIDAD

Mr. Cale Rossell
Agricultural Development Officer
USAID Bridgetown
Aid for International Development
Dept. of State
Washington, D.C. 20523

Dr. T. U. Ferguson
Faculty of Agriculture
University of the West Indies
St. Augustine, Trinidad

Mr. John A. Spence
Professor of Botany
Faculty of Agriculture
University of the West Indies
St. Augustine, Trinidad

GUYANA

Mr. Dwight Steen
Food and Agricultural Officer
USAID Georgetown
Aid for International Development
Department of State
Washington, D.C. 20523
